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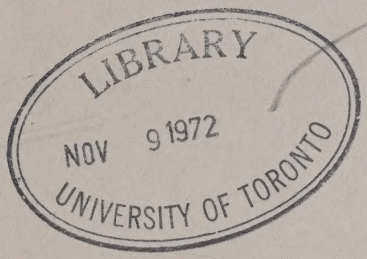

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INTERNATIONAL LABOUR OFFICE

STUDIES AND REPORTS
Series N (Statistics) No. 1

SYSTEMS OF CLASSIFICATION

OF

INDUSTRIES AND OCCUPATIONS

Report prepared for the International Conference of Labour Statisticians (29 October to 2 November 1923)

DECEMBER 1923

GENEVA

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PRELIMINARY NOTE

An International Conference of Labour Statisticians was held under the auspices of the International Labour Organisation at Geneva from 29 October to 2 November 1923 for the purpose of discussing the principles and methods upon which certain branches of labour statistics should be drawn up from the point of view of international comparisons.

The agenda, which was determined by the Governing Body of the International Labour Office, consisted of the following three subjects:

(*a*) The classification of industries and occupations for the purpose of labour statistics.

(*b*) The statistics of wages and hours of labour.

(*c*) The statistics of industrial accidents.

A report on each of these subjects was prepared by the Statistical Section of the International Labour Office and circulated in advance to the Governments, together with certain draft resolutions which were submitted as a basis for discussion. These reports, though prepared primarily for the Conference, are in effect self-contained and independent studies of the different subjects and many problems are treated which were not discussed at the Conference. It has therefore been decided to publish the Report separately from the account of the proceedings of the Conference. The present Report is as submitted to the Conference of Labour Statisticians, with the exception of minor modifications in statements of facts.

The draft resolutions submitted to the Conference, together with a résumé of the discussions and the definitive resolutions adopted, will be found in the General Report of the Conference [1] which is issued simultaneously with this Report.

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[1] INTERNATIONAL LABOUR OFFICE: *International Conference of Labour Statisticians.* Report on the International Conference of Representatives of Labour Statistical Departments, held at Geneva, 29 October to 2 November 1923. Studies and Reports, Series N (Statistics) No. 4. Geneva, 1923.

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PREFACE

A classification of industries and occupations forms the indispensable framework of all labour statistics. The International Labour Office found it necessary from the very commencement of its work to deal with this problem. A Resolution passed by the International Labour Conference at its First Session, held at Washington in 1919, invited the Governing Body of the International Labour Office to form an international commission "empowered to formulate recommendations upon the best methods to be adopted in each State for collecting and publishing all information relative to the problem of unemployment, in such form and for such periods as may be internationally comparable."

As a result of this Resolution, the Governing Body of the International Labour Office decided, on 8 June 1920, to establish a Commission of three members, one from each group of the Governing Body. This Technical Commission, which was assisted by a number of experts, met at various dates during 1920 and 1921. In the report which was prepared by the Commission, and with the object of facilitating the agreement of the different governments, the classification of industries and occupations given in the *Répertoire technologique des noms d'industries et de professions* was taken as basis. The report of the Technical Commission on Unemployment was presented to the session of the Governing Body of the International Labour Office which was held in April 1921. The Governing Body, without pronouncing any opinion on the drafts included in the Report, authorised the Director of the International Labour Office to communicate the proposals to the Governments of the Members of the International Labour Organisation, which were requested to give their opinions thereon (1). The replies received from the different Governments

(1) This was done on 16 September 1921.

have been reproduced and examined in the brochure *Methods of Compiling Statistics of Unemployment*; *Replies of the Governments*(1).

The replies of the governments showed that agreement could be reached only by considering the problem in relation not merely to unemployment statistics but to labour statistics generally, and even to other statistics such as those of the general census. Thus in the reply of the Canadian Government the opinion is expressed that "it is greatly to be desired that any international classification put forward should be along lines dictated by principles capable of general application," while it is indicated that the Dominion Bureau of Statistics in its own statistical compilations has effected a "co-ordination between such fields as the census, statistics of the different phases of production, unemployment, etc." The reply of the German Government shows that "as regards German social statistics the comparison between the results of trade censuses and with the classification which forms its basis must be maintained," and that criticisms of the proposals of the Technical Commission on Unemployment depend on the classification of occupations adopted for the census.

The British Government stated that such modification as it is likely to effect in the near future will be in the direction of making classifications of unemployment data "correspond more closely with the industrial and occupational classifications adopted in connection with the 1921 census of population".

The Belgian reply indicated that the classification adopted at the time of the 1910 sensus forms the basis of all the official publications issued in that country.

The Norwegian reply states definitely that the "question of an international classification of trades and industries cannot be treated as an isolated problem and solved only with a view to its connection with unemployment statistics. The problem must be treated in connection with that of a general classification of trades and industries, and the point of departure must be the classification adopted for the needs of the census and for establishing statistics of the principal industries."

The conclusion reached by the International Labour Office as a result of this first consideration was that "the problem of an international classification of industries and occupations cannot be

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(1) International Labour Office: *Methods of Compiling Statistics of Unemployment; Replies of the Governments.* Studies and Reports, Series C (Unemployment) No. 7. Geneva, 1922.

treated only in connection with the problem of unemployment statistics but must also be considered in connection with social statistics generally. An attempt has been made in each country to consider the data supplied by these statistics in connection with those derived from the general census, and, in consequence, an attempt has been made, as a general rule, to harmonise the industrial or occupational classification adopted in unemployment statistics with those in use for the purposes of the general census."(1)

The problem to be solved thus goes beyond the scope of unemployment statistics, and the necessity of a study of this problem on general lines has been demonstrated. In preparing the present report the considerations of the governments regarding the proposals made by the Technical Commission on Unemployment have been of considerable value. They have revealed the difficulty of effecting a greater degree of uniformity in the classifications of the States except on the basis of agreement as to certain fundamental principles. They have also indicated the possibility of agreement on the main groups of industries and services, even if standardisation in the subdivisions is not attainable.

It is on these lines that the International Labour Office has continued its study of the problem. An attempt has been made to draft a system of classification based on principles capable of general application.

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(1) Op. cit. p. 53.

REPORT ON SYSTEMS OF CLASSIFICATION OF INDUSTRIES AND OCCUPATIONS

I

Introduction and General Considerations

Statistics of Industries and Occupations have a two-fold purpose. They are, first, of general interest as showing the importance of the different industries in the national economy, the extent to which a nation is engaged in or dependent on particular industries or services, their growth and decay from time to time, or their state of development as compared with those of other countries. They have therefore an interest in themselves as giving an indication of the economic structure of a country. They have, however, special purposes, viz. their use, in combination with other factors, in throwing light on social and industrial conditions. In all classes of labour statistics (and also in other branches of statistics) it is generally essential that the data should be grouped according to industries and occupations. With these other branches (which include, for example, cost of production, taxation, vital statistics, etc.) this report is not primarily concerned, but as regards statistics of wages, trade disputes, employment and unemployment, industrial accidents, etc., it is essential that the data available should be grouped, in some way or other, in order to show the variations within the country or between different countries in the characteristic considered (wages, unemployment, etc.), either from trade to trade or occupation to occupation.

The general problem can be approached in either of two ways. We may consider the matter *a priori*, and decide the nature of the classes or groups, or we may examine the material existing — the individuals in their various economic and social activities — and see into what group they fall, and how they may be grouped by recognisable and suitable characteristics. In considering the classification of workers from the point of view of international compari-

sons, M. Bertillon, in his scheme presented to the International Statistical Institute in 1893, proceeded according to the first method (1). This method is also generally adopted in those countries which make a census of the population at long intervals (usually ten years). The individual is invited to state what his occupation is and the replies, which vary in completeness, accuracy and clearness, are grouped, as best possible, according to some system of grouping or classification previously laid down. In all these cases the individual worker as such is the unit of classification.

In the second way the classification is based not on the worker as an isolated part of the economic body, but on some grouping of the workers existing for definite purposes. These groupings differ from country to country, but also according to the economic organisation or social and industrial developments of the community. In some cases these are occupational groups, in some cases industrial groups, and in certain cases they are social or localised groups. An enumeration of the different branches of labour statistics brings this clearly to light.

Statistics of employment and unemployment are based on four chief sources: trade unions, organisations (other than trade unions) for the provision of unemployment benefit, labour exchanges, and employers; and in each the classification is necessarily different. In classifying statistics of unemployment based on trade unions the system of organisation of the workers in trade unions must necessarily be adopted. In some countries trade unions have developed on industrial lines, but in the majority of countries the craft or occupational organisation is predominant (2), and statistics of unemployment based on trade union returns are usually occu-

---

(1) Dr. Bertillon's plan, in his own words, was as follows:

« (A). L'homme se procure les matières premières nécessaires à toute profession soit par l'exploitation du sol (I. *Agriculture*), soit par l'exploitation du sous-sol (II. *Extraction de matières minérales*).

« (B). Ces matières premières sont ensuite transformées par l'industrie (III. *Industrie*), portées à l'endroit où elles sont demandées par les moyens de transport (IV. *Transport*), et distribuées entre les consommateurs par le commerce (V. *Commerce*).

« (C). Pour veiller au bon ordre et à la sécurité des professions qui procèdent, chaque pays possède une armée et une gendarmerie (VI. *Force publique*), une *administration publique* (VII). Les *professions libérales* (VIII) et les *personnes vivant de leurs revenus* (IX) trouvent tout naturellement leur place à la suite des professions que nous venons de passer en revue.

« (D). Enfin, il convient d'établir trois divisions professionnelles pour les individus non classés ou sans profession: viz. (X) *Travail domestique*, (XI) *Désignations générales sans indication d'une industrie déterminée*, (XII) *Improductifs, Profession inconnue.* »

(2) Recent developments appear to be in the direction of organisation more on industrial lines.

pational in character. The basic unit is the trade union. Statistics of unemployment supplied by unemployment benefit organisations other than trade unions are generally based on the individual worker. According to the details obtained, these may be grouped occupationally, or occupationally and industrially. Statistics derived from employment exchanges are "occupational" and are intended to show the demand for a supply of workers in different occupations. They are based on the individual worker. Statistics of employment are based on the returns from employers or from establishments, and are on a very different basis. The basic unit is the establishment or, in the case of establishments carrying on different branches of work, the department.

Statistics of rates of wages, earnings, and hours are based to a large extent on two sources: data furnished by employers as to rates and earnings of workers on their payroll, and data based on collective agreements. In the first case the basic unit of the statistics is the undertaking or branch of the undertaking. In the second case the basic unit is usually the trade union. In certain countries special wage censuses are taken from time to time (*e.g.* the United Kingdom, 1906; Germany, 1920), but it should be noted that these are based not on the individual worker as unit but on the undertaking.

Statistics of industrial accidents and diseases are largely based on establishments. It is the invariable rule that the onus of preventing, of insuring against, and of notifying, accidents rests with the employer or firm, and not with the individual worker. Insurance against accidents is carried out either by employers' associations or by private or State insurance companies, whose rates of premium are usually based on payrolls.

Statistics of strikes and lock-outs are based on the establishment or reports from trade unions. An industrial grouping, based on the establishment affected, is the grouping adopted in most countries for the presentation of these statistics.

Statistics of collective agreements which are published by a few countries are based chiefly on information supplied by employers' or workers' organisations, and remarks similar to those made above as to statitics of unemployment and wages based on employers' and workers' organisations apply here.

Statistics of sickness and invalidity constitute a class somewhat apart from other branches of labour statistics. In countries where sickness insurance funds exist, the nature of the statistics depends upon the organisation of these funds. These may be established

on the lines of special industries or of a combination of several industries within the same locality or district. In the United Kingdom and France the statistics are based on voluntary or State-aided associations of workers with or without families. In some countries the trade unions, and even social and religious organisations, undertake sickness insurance.

II

Difference between "Occupation" and "Industry"

The above paragraphs show that there are two distinct points of view from which the economic activity of the population may be regarded — that of occupation and that of industry (1). The former is personal to the individual, the second shows the position of the worker in the economic structure of the country. The basis of the latter is the firm, establishment, undertaking, or service with which the worker is connected, and within this group, categories of workers of various occupations are employed. The phrase "engaged in occupations" (or, in the French phrase: *la population active*) covers all those persons who are "engaged in the production of utilities or in the rendering of services". Logically this definition covers all those wives and other members of a family who render services for which no payment is usually rendered, but as no economic bargaining or no "cash-nexus" enters into their relation with the community, they are often excluded from consideration, and the term "occupied" is here limited to those "gainfully occupied".

The fact that occupations are personal and based on the individual worker, and that industries are based on the plant or establishment, implies that occupations exist within industries and not vice-versa. It is true that certain occupations exist in only one industry (for example coal miners in the mining industry), but all the chief occupations are found in most industries. No extensive statistics exist at the present time to show the extent to which occupations are divided among the different industries, but the

(1) In the reply of the British Government on the draft classification proposed by the Technical Commission on Unemployment it is stated definitely that "industrial" and "occupational" are quite distinct concepts, and if statistics of industry and occupation are to illuminate the facts to which they relate, they must be arranged according to distinct classifications.

following table is of interest as showing for certain workers insured against unemployment in 1913 in the United Kingdom their classification both according to their personal occupations and the industry with which they are connected:

Occupations	Industries					Total including other industries
	Building	Construction of works	Shipbuilding	Engineering and iron founding	Construction of vehicles	
Carpenters and joiners	147,452	3,177	13,871	10,118	4,940	191,561
Plumbers	43,726	688	3,047	2,808	564	52,950
Platers, rivetters, and boiler makers	412	3,018	53,801	41,601	2,640	102,926
Fitters and turners	5,138	2,287	12,497	240,721	33,261	319,562
Smiths	2,560	1,346	5,001	27,928	10,492	55,299
Metal machinists	61	710	3,634	71,074	16,899	92,689
Cabinet makers, french polishers, etc.	4,718	6	2,380	602	5,638	13,437
Labourers	321,994	24,973	134,601	306,169	47,283	866,796

This table shows how distinct are the two classifications. Of the carpenters, over 25 per cent. are employed in trades other than the building trade, and of the platers and rivetters less than 50 per cent. are shipbuilding workers. Metal machinists are found in nearly all industries, only 75 per cent. being in the engineering trade. The classification of industries must therefore be considered independently of that of the classification of occupations. There is not a "classification of industries and occupations", but a "classification of industries" and a "classification of occupations".

The industrial classifications adopted in most countries, as has been pointed out by the British Government(1), "are arrived at after condideration of the administrative and informative objects which the statistics have to serve, and alterations cannot generally be made in these classifications except as are calculated to further those objects or could be shown to be imperative on grounds transcending those of administrative efficiency and of domestic inform-

(1) International Labour Office: *Methods of Compiling Statistics of Employment; Replies of Governments.* Studies and Reports, Series C (Unemployment) No. 7. Geneva, 1922.

ative utility". Classifications also differ from country to country according to the natural resources and industrial development of the country. Industries differ in importance and degree of development from one country to another, and the processes employed, the progress of inventions and the division of labour lead to the existence of certain occupations which do not exist in less developed countries. For instance, in a country where coalmining is highly developed the gradual development of technical processes and the division of labour have necessitated very complicated and detailed lists of occupations. In countries where very little or no coalmining is carried on, the terms and their meanings would be unknown, and the workers may be classified together under one heading of "coalmining " or even grouped to some other industry (1). Notwithstanding these admitted difficulties it may be possible to achieve some progress in rendering more comparable the systems of different countries.

III

Relative Advantages and Disadvantages of a Classification of Industries and a Classification of Occupations

The chief advantage of a census of workers classified by occupations is that it may be made fairly complete. The censuses held — usually at ten-yearly intervals — in most countries are effected by a system under which a schedule is filled up in respect of each individual. By decentralisation and local control it is possible to cover every household or habitation in the country. A census of workers classified by industries, can never claim the same completeness. It is impossible to cover every undertaking in the country, especially small undertak ngs consisting of a few persons or even of one person. There is also a risk of duplication; individuals may work for more than one establishment and may be included under each, and branches of establishments might be included twice — once as a branch, and again among the figures for the establishment as a whole. Further, persons normally in employment but temporarily unemployed would be excluded. Hence an enquiry by occupa-

(1) In some countries the small amount of coal which exists is found on the surface and workers are classified along with agriculture.

tions is of advantage if a complete record of the occupied population is required. Such records are required for general demographic purposes — statistics of mortality, fertility, occupational diseases — and for housing questions. They are, however, less likely to be accurate than statistics of industrial establishments. In the first place the term "occupation" does not convey the same idea to different individuals. Some workers have more than one occupation, some change their occupation according to the season of the weather or the state of trade. If a worker cannot obtain employment in his normal occupation he frequently finds it in another. An unemployed worker may give as his occupation either his last occupation or no occupation. The terms used to describe an occupation are frequently vague and lacking precision. Often they are local or colloquial terms whose meaning is imperfectly known. Even if correctly described they often cover different categories of workers. Two individuals may both return themselves as "joiner" or "turner", or "weaver", but in the one case the worker may be a highly skilled worker and in the other a semi-skilled or unskilled worker whose earnings and position ir the establishment might be quite different from that of the former worker. It has also been pointed out (1), for example, that "a worker may quite correctly describe himself or herself as an 'embroidery worker', but the difference between hand and machine embroidery is as great as that between a monk who transcribes the Gospels and the machine operator who prints them." These difficulties are partly minimised if, in addition, the name of the employer or the nature of his business is also given and if careful instructions are given (and followed) as to the exact description of occupations to be given by the individual, but a trained staff with intimate knowledge of local establishments and of technical processes would be necessary for checking the various statements. A correct occupational census requires a full and detailed description of the work performed by each individual or a comprehensive "glossary" of occupational terms in which the various terms, local and special, are described in detail (2). Enquiries based on the

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(1) Dr. Schwarz-Lyon, in *Revue économique et statistique suisse*, 57th year, Vol. III, 1921.

(2) These difficulties can be illustrated by reference to the British and American experiences. The *Report on the Occupational Statistics of the English Census of 1911* states: "On the present occasion an experiment has been made on a considerable scale in order to test the feasibility of introducing a consistently personal classification of occupations which should tabulate by the nature of the process performed by the individual worker those sections

personal occupation have also sought to obtain information as to the industry or service with which the individual is connected, and as to the place he occupies in the industry or service, but the results have not hitherto been satisfactory. If it is desired to know the extent to which the economic life of the country is dependent on different industries, etc., the sources of the national wealth and income, it is to the existing economic organisations that attention must be drawn, *i. e.* the establishments or under-

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of the list which are now classified only according to the nature of the product or of the material worked in. Special cards were prepared for over 700,000 workers in the selected headings, and the description given in the household schedule of the actual occupation was written on each card. The cards were then sorted by hand according to the process carried on, persons classified to the headings 'cutlers', 'scissor-makers' and 'tool-makers' for instance being divided into buffers, grinders, finishers, etc., and makers of tools, scissors, razors, etc., as the case might be, who gave no further description of their occupation. The latter class was found in most cases to be so large that on the whole the attempt can only be characterised as a decided failure. As a result of the experience so gained we have reluctantly come to the conclusion that unless by some improved means of collecting census information the nature of the material to be tabulated can be greatly improved, any logically consistent tabulation in our census of workers by personal occupation is unattainable and that the present system of classification partly by occupation and partly by product must be adhered to."

The difficulty that occupations may mean very different things in different countries and require to be divided and sub-divided into such detail that any international comparison is impossible may be illustrated by reference to American practice. The following are the definitions of a "joiner" and of a "patternmaker" as given in the *Descriptions of Occupations* published by the United States Department of Labour: "JOINER: The duties of a joiner are to construct high-grade woodwork and to assemble machine-made woodwork. He must be an experienced hand, capable of reading drawings and sketches and laying out and doing all classes of joinery work. He must be able to do all classes of wood assembly work, such as making sashes and window frames, doors and door frames, and general house building, wood fixtures, desks, file cases and special boxes and instrument cases, and installing mill-made interior finish. He must be a competent bench hand and should have had some experience in the use of woodworking machinery. PATTERN MAKER, WOOD: The duties of a wood patternmaker are to make the wooden forms by the use of which the foundryman shapes a mould for the purpose of producing metal castings. As a woodworker the patternmaker must be an all-round skilled man in the use of common bench, woodworking and turning tools, and in the operation of such woodworking machinery as the jointer, planer, circular saw, band saw, disk sander and special core-box machinery. He must know the best kind of wood to use in any given pattern. He must understand draft and shrinkage as applied to pattern making and must have a thorough knowledge of the most complex mechanical drawings, so that he will be able to make a pattern drawing sketch from the shop drawing. He must undertsand core making and the allowance for core and core print in the construction of the pattern. He must be resourceful and able to determine quickly the best method of making the pattern. He must know pattern finishes and the care of finishing material and brushes. He must have good health, ordinary strength, and endurance. He must have had experience as a journeyman-patternmaker".

"Joiner" is one of the most frequently used terms in all occupational statistics and it would be of interest to know how many persons classified as joiners in the different countries are comparable with this American joiner.

takings, and the services. A classification based on data obtained from such units has the advantage of enabling information to be given as to the status of the workers — handworkers and machine workers; skilled and unskilled and semi-skilled; supervising and directing staff; productive workers and distributive workers, etc.

IV

Existing Attempts at Standardisation

That there is need for some international scheme has been repeatedly shown. Over thirty years ago the subject was frequently discussed at the meetings of the International Statistical Institute and, at the present day, when international statistical comparisons of wages, unemployment, etc., are being attempted more than ever before, the need is even greater. The scheme prepared by M. Bertillon and approved by the International Statistical Institute in 1893 has been referred to above. It is called a *Statistique des Professions*, but on examination it appears to be rather a combination of a *Statistique des Industries* and a *Statistique des Professions*. It consisted really of three schemes, the second and third each being expansions of the preceding one. The first scheme (given in Appendix I) contained 61 groups, the second 207 and the third 499; and the general basis of his classification is given on page 12 above.

That this classification was not logical can be shown be a few examples. Under "Transport" for example the classification is as follows:

1. *Transports par chemin de fer :*
   (*a*) Chemins de fer; administrateurs, employés, ouvriers, agents de toutes sortes.

Under "Building" we have the following:

1. *Industrie du bâtiment :*
   (*a*) *Charpentiers et menuisiers :*
   Charpentiers;
   Menuisiers, rampistes;
   Parqueteurs, raboteurs.

Under "Metallurgy" we have the following:

1. *Fabrication des métaux :*
   (*a*) Fabrication de la fonte, du fer, de l'acier; fours à puddler, laminage.

The first example seems to be a true industrial classification — all railway workers are grouped together and no occupations are separately shown. In the second example we get an occupational classification, and carpenters, joiners, etc., are set out separately. One naturally searches for the large number of carpenters and joiners engaged in other industries. The only indication is that given in a footnote which states, against carpenters — not including "charpentiers en bateaux et charpentiers marins". These are to be included in the heading: *"Constructions d'appareils de transport: Construction de bateaux."* The large number of carpenters and joiners engaged in making vehicles, and the smaller, though considerable, number engaged in engineering, mining, and, in fact, nearly all industries, are not mentioned. In the third example we are given a grouping which is neither an industry nor an occupation, but a process of manufacture, and the occupations therein, which are just as important as the *parqueteurs* and *raboteurs* shown separately for the building industry, are not given. Other and similar examples might be given from Bertillon's classification.

Another and fairly recent proposal is that put forward by the British Empire Statistical Conference, held in January 1920 and attended by representatives of the United Kingdom, of India, Australia, Canada, New Zealand, South Africa, and of four Colonies and Protectorates, for the purpose of discussing the co-ordination of statistics within the British Empire. As regards the classification of industries and occupations it passed the following resolutions:

> The classifications [of industries and occupations] should be based on two lists, one of industries and the other of occupations, each heading being defined and given a reference number and the heading so arranged as to be capable of grouping into classes according to a fixed and defined system.
>
> The basic principle of the industrial classification should be the product or type of service, and that of the occupational classification, the process carried out and the materials worked in.

It will be seen that this resolution insists that there should be two classifications — one of industries and another of occupations. The resolutions in full, together with the proposed list of groups, etc., are given in Appendix II.

A further effort, not for international standardisation but moving in the same direction, was that undertaken under the auspices of the International Statistical Institute in 1909 for the publication of a *Repertoire technologique* in English, French and

German, of Industries and Occupations. The system of classification was largely based on that adopted in the Censuses of France, the United Kingdom, Germany, and other countries. It is given in Appendix III.

The attempt of the International Association of Industrial Accident Boards may be mentioned, though it had only limited application. This body comprises the administrative authorities of some 50 states of North America and Provinces of Canada, and has for its object the improvement and standardisation of Accident Statistics. It has prepared a standard list of industries suitable for the classification of industrial accidents. This list comprises 8 divisions, 36 schedules, and 153 groups. The list of Divisions and Schedules is given in Appendix IV.

Finally, reference should be made to the Classification proposed in 1921 by the Technical Commission on Unemployment of the International Labour Organisation. An examination of the replies of the different governments (1) with regard to this proposal indicates that there were various objections of a detailed character to the draft outlined, and that furthermore, to obtain general approval a scheme should be considered not only in connection with the problem of unemployment statistics but also in relation to labour statistics, and an attempt made to harmonise as far as possible a classification appropriate for these purposes with one suited to the purposes of the general census.

V

Classification of Industries

A. *Classification of the Main Groups of Industries and Services*

In considering the scheme of classification of industries it is advisable to draw a distinction at the outset between the wider meaning of the term "industry" in the phrase "classification of industries", and its restricted and more frequent use to cover factory and similar undertakings. To avoid confusion the term "manufacturing industries" will be used in this report wherever the latter meaning is intended.

The main object of classification of industries is to furnish a

(1) See International Labour Office: Op. cit. pp. 27-54.

scheme for an appropriate division of the population into the different branches of industrial life in order to enable a judgment to be given on the productive and commercial capacity of a country and on the part taken by the different sections of the population in the total work done by the community. A judgment of this kind is of the highest importance in the solution of labour problems, and though different branches of labour statistics might, taking account of their special purposes, demand a classification of industries somewhat different from one suitable for the general purpose outlined above, the latter might nevertheless be considered as taking the first place in our considerations. All the schemes of classification mentioned in the previous section and of those generally adopted in different countries, have been established mainly with this purpose in view. They show that as regards the main groups of industry there is general agreement, and these may be dealt with first before considering the more difficult and, from the point of view of labour statistics, the more important group of manufacturing industries.

Where economic conditions are more simple than in modern industrial communities (1), specialisation of function is practised to a small extent only, and many quite distinct tasks are performed by the same individual. Most people are engaged in agriculture and allied occupations, and it is impossible to separate those who cultivate the ground, tend the animals or fell trees from those who use the raw materials produced by these occupations, in the preparation of food, the making of clothing, or the construction of buildings. Again, with the exchange of goods usually the same individuals who produce the raw materials and work them into a more useful form also transport them to the places where they can be bartered for other goods, and undertake the commercial functions involved. Even those engaged in the government of the community often take a considerable part in agricultural, pastoral and other productive activities. No doubt, however, some specialisation always existed and with economic and industrial development it became more and more possible to divide members of different communities according to the work on which they were chiefly engaged. A broad distinction can be drawn between dwellers in the country chiefly engaged in obtainin graw materials, whether by cultivating the soil or extracting various minerals,

(1) Whether in early times or in non-industrialised communities at the present time.

and town dwellers generally engaged in manufacturing various finished products or in performing commercial or administrative functions. The function of transportation developed largely to provide a link between the two, while the specialisation of individuals on the work of personal and domestic service or in the different professions enabled other members of the community to devote a greater part of their time to their special tasks. Thus, although many individuals continue to perform two or more distinct functions, it becomes possible to classify most members of the community according to their principal task.

On the lines indicated, therefore, distinction may be made between workers engaged in producing material goods and those rendering services, *i. e.* who do not produce commodities but are engaged in their sale and distribution or in satisfying moral or social needs. The former group may be further divided into two broad classes of primary producers, *i.e.* those engaged in the obtaining of raw materials and food products from natural sources, and secondary producers, which includes those concerned with the treatment of raw materials.

We thus get the three principal divisions: primary production, secondary production, and services; and these divisions are generally well defined and recognised groups which overlap to a small extent only. Primary producers are usually divided into the two distinct groups of "agriculture" (including fishing, forestry, etc.), and "mining and quarrying". Services are often divided into the five groups of "transport"; "commerce"; "public administration"; "professions"; "domestic and personal service". The subdivisions of secondary production are dealt with in detail in Section B (1).

These three principal divisions, with the sub-divisions mentioned, are fairly well defined, and are found in practically all classifications. This is evident from an examination of table I, in which a résumé is given of the official classification of about a dozen countries, together with the Bertillon system of classification, which has been adopted by about eight countries. These countries are, as far as is known, India, Egypt, Bulgaria, Spain, Brazil, Chili, Venezuela, and Mexico (2). The other countries included in the table are the

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(1) It is unnecessary to discuss in detail the subdivisions of the groups of primary producers and of those rendering services, as there appears to be general agreement with regard to them. A few borderline cases are considered in footnote (1), on page 26.

(2) It may be noted that for the census of 1920 in Spain, a new classification (see Appendix V) has been adopted based largely on the Bertillon scheme, but with certain modifications.

Bertillon	United States	United Kingdom	Canada	Australia	Switzerland
I. Agriculture and fishing	1. Agriculture	1. Fishing 2. Agriculture	1. Agriculture 2. Fishing	6. Primary products	1. Agriculture, mining, fishing
II. Mining	2. Extraction of minerals	3. Mining and quarrying	3. Mining		
III. Industry	3. Manufacturing and mechanical industries	4–15. Industries	4. Manufacturing 5. Construction	5. Industry	2. Industry
IV. Transport	4. Transportation	16. Transport and communication	6. Transport	4. Transport	4. Transport
V. Commerce	5. Trade	17. Commerce and finance	7. Trade (*i.e.* dealers) 8. Finance	3. Commercial	3. Commerce
VI. Defence					
VII. Public administration	6. Public services and defence	18. Public administration and defence	9. Services, *i.e.* public administration, defence, domestic, and professions	1. Professional	5. Public administration and professions
VIII. Liberal professions	7. Professional	19. Professions			
IX. Domestic	8. Domestic and Personal	21. Personal service		2. Domestic	6. Personal
X. Independent				7. Independent	
XI. Unclassified		22. Other industries or industry not stated	10. Miscellaneous		7. Unknown
	9. Clerical occupations				
		20. Entertainment and sport			
XII. Unoccupied				8. Dependents	

D SERVICES IN VARIOUS COUNTRIES

Germany	Belgium	France	Italy	South Africa	Imperial Statistical Conference
1. Agriculture and fishing	1. Agriculture and fishing	1. Fishing 2. Agriculture	1. Agriculture and fishing	4. Agricultural	1. Primary producers (agriculture, mines, and fishing)
2. Industry, mining, and construction	2. Mines 3. Quarries	3. Extractive industries	2. Extractive industries	5. Industrial	
	4–17. Industries	4. Industries « de transformation »	3-8. Industries, incl. transport		2. Secondary producers (treatment of raw materials and manufacture)
3. Trade, commerce, and hotels	18-20. Transport	5. Transport		3. Commercial (including transport)	3. Transport, communication, post and telegraph
	21-34. Commerce 35. Banking and credit 36. Insurance 37. Intermédiaires commerciaux 35. Hotel	6. Commerce, banking, entertainment	9. Commerce		4. Trade and commerce
7. Military, civil, and liberal professions	39. Public undertakings	9. State services	10. Public administration, defence, and liberal professions	1. Professional	5. Public administration, defence, and professions
		7. Liberal professions			
8. Domestic		8. Domestic and personal		2. Domestic	6. Domestic
				6. Indefinite 7. Unspecified	7. Other industries
9. Unoccupied			11. Unoccupied	7. Dependent	8. No industry

United States, the United Kingdom, Canada, Australia, Switzerland, Germany, Belgium, France, Italy, and South Africa, and their classifications are given in further detail in Appendix V.

Evidently it would be possible to apply other different systems of industrial classification to the population as a whole or in sub-dividing the groups outlined above. Thus the character of certain products or services of special importance to the community as a whole whose uninterrupted supply is necessary to its existence may be combined into a group "public utility services". Such a grouping based in the special character of the products or services may be necessary for certain purposes but is not of primary importance in showing the economic structure of a country. Again, industrial units may be classified according to the nature of their ownership and distinction drawn between publicly and privately owned undertakings. Account may be taken of such distinctions within the groups proposed here, and a combination of sub-divisions with like characteristics in different groups made to meet special statistical requirements.

The following list, based on the clear delimitation of functions of members of modern communities, and which is in conformity with the divisions of almost all existing classifications (1), may be put forward as one likely to meet with general acceptance:

CLASSIFICATION OF INDUSTRIES AND SERVICES

A. *Primary Production*

I. AGRICULTURE, *i.e.* the cultivation of the soil; the tending of animals, etc.; fishing, forestry, etc.

II. MINING, QUARRYING, etc., *i.e.* extraction of minerals (2)

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(1) Although the main divisions and sub-divisions are similar in practically all classifications and are generally distinct, some borderline cases may be mentioned. Thus some countries, *e.g.* Belgium and Germany, give "Hotels, Boarding houses, etc." with Commerce, a course which is adopted also in the Bertillon scheme, though it is often given under the heading "Personal and Domestic Service" (*e.g.* in the United Kingdom), a practice which is followed here). Again, "Transport" is almost always given separately as in the proposed classification, but in South Africa is grouped with "Commerce". Stone cutting is sometimes grouped (*e.g.* in Germany) with Quarrying, but in most countries among the manufacturing industries. Laundering is given in the British classification under the heading "Personal Service". In France it is given with the manufacturing industries under "Textiles" while, in Belgium and Switzerland it is similarly included under "Clothing". In the proposed classification, stone cutting and laundering are given amongst the manufacturing industries and are discussed in Section B.

(2) Here a general distinction is drawn between minerals and metals, the "extraction" of metals from ore not being included in this group.

B. *Secondary Production*

III. Manufacturing Industries, etc., the transformation or modification of materials, together with the construction of buildings, roads, etc., and the repair of finished products.

C. *Services*

IV. Transport and Communication.
V. Commerce and Finance.
VI. Public Administration and Defence.
VII. Professional Services.
VIII. Domestic and Personal, *i.e.* the supply of "board and lodging," and the rendering of personal services for which remuneration is paid.

B. *Classification of Manufacturing Industries*

As already indicated, the term "manufacturing industries" is used in this Report to cover all establishments engaged in the secondary processes of production. The expression is not entirely satisfactory, as one does not generally speak of the manufacture of railways, or even of houses, but it accurately describes the great majority of establishments included in this category, which is of special importance in connection with labour statistics.

An examination of the attempts which have been made at standardisation and a review of the classifications adopted in a number of countries (1) indicate that a logical system of classification might be established on one of the following bases: (1) the materials used; (2) the process; and (3) the nature or purpose of the product. As it is evidently desirable that principles capable of general application should be adopted if possible in any international classification, the bases mentioned will be examined in turn, in order to discover their merits and defects.

I. *The Materials worked in.*

In the early stages of industrial development — and to a lesser extent in new countries at the present time — the materials worked in were fundamental in determining the industrial structure of a community. Usually one material was taken and transformed into a finished product, generally without being combined with other materials of a different kind. In modern industry, largely as a

(1) The classifications considered are chiefly those given in table II (see pp. 30, 31), further details of which are given in Appendix V, while the sub-groupings in the original sources have also been examined, as have various other classifications mentioned in the text.

result of inventions of various kinds, products of mixed materials have become much more common, while much more than formerly the same product is made of different materials, or different products of the same material. Metals, and particularly iron and steel, have increasingly extended their sphere and are now used in making a large number of articles previously made of wood or stone. As examples of such changes mention may be made of ships and bedsteads, which at one time were made only of wood but are now made in some cases of wood and in others of iron. Again, rubber is now being used in the manufacture of clothing and many other products in which previously it was never used. In some products, artificially made materials are used largely where previously only materials from nature were used. The difficulties under discussion are evident also from a somewhat different point of view, namely, that often one material is used in a large number of different industries. Thus establishments working with wood are now found in the forestry, lumber, building, engineering, shipbuilding, automobile, and furniture industries, while a similar situation arises with regard to metals. These changes, which have made modern industrial life so complex, have rendered very difficult the problem of classification, and have made any classification based only on the materials used quite unsuitable for statistical purposes, and if strictly applied would involve the formation of a very extensive and cumbersome "miscellaneous" group.

The difficulties are usually less in the early processes of manufacture than in the finishing stages. In early manufacturing processes, when the raw material is being dealt with, generally only one predominant material is worked in, and classification by material is clear and definite, while any finished products for which no complicated processes are necessary usually consist of one material only. Thus in the metal industry the first processes are smelting, converting, refining, etc. and are followed by such secondary processes as founding. Industries so engaged, *i.e.* in the production generally of partly manufactured goods, are often best classified according to the material worked in. It is generally only in the later stages of manufacture that great difficulties arise, which can sometimes be solved by forming separate groups based on the product. This is especially the case where the final processes are quite distinct from the earlier ones, and carried on by different industrial units. As examples of the types under discussion may be given the textile industry which is mainly concerned not in the

manufacture of final products but in the manufacture of the "raw material" of the clothing industry. A similar distinction may be drawn between the metal processes outlined above and the manufacture of machinery and other finished goods.

Where a group can be formed on the basis of the distinctive character of the product, with industrial units and processes generally different from those engaged in the production of the partly manufactured goods, it appears desirable not to classify according to material. Thus the products "boats and ships" are quite distinctive in character, the industrial units engaged in their construction do not generally produce other goods, and to group them together instead of separating them according to the predominant material is more satisfactory from the point of view of giving a survey of the industrial structure of the community. Many examples of a similar kind could be given. With some products, however, of comparatively small importance, even if made of mixed materials, it may be more convenient to classify them according to the predominant material. This is especially so where one material predominates very largely. Also in a number of cases where the industrial units manufacturing the finished products, and the processes used, are difficult to separate from those engaged on the earlier stages of manufacture, it may be preferable to classify according to the material used.

In certain cases industrial developments have left the materials used unchanged, but the process used has been fundamentally altered. This is particularly the case with textiles, where there has been a change from hand-loom to power-loom weaving although the main features of the materials handled and of the product have been left unchanged. Where this is true the difficulty of classification discussed above does not arise.

In order to facilitate the transference of workers from one industry to another, a classification based on the materials used might be considered from the point of view of labour statistics to be of prime importance. It is evident that in many cases information is desired regarding the conditions of workers of the same craft engaged in the manufacture of different products. Thus data with regard to woodworkers may be required irrespective of whether they are engaged in sawmilling, furniture making, in building or in the construction of vehicles or wooden ships. A study of recent developments, however, in the trade union movement in a number of countries, shows that the workers themselves, though often organised on craft lines, are now adopting more and more an

Bertillon	United States	United Kingdom (Industrial)	Canada	Australia
7. Textiles	2. Textiles and their products	7. Textiles and textile goods (not dress)	3. Textiles	2. Textiles and dress
8. Leather, skins	5. Leather and its products	8. Skins and leather	2. Animal product industries	4. Animal and vegetable substances
9. Wood workers	4. Lumber and its products	11. Wood and furniture	4. Wood and paper	
10. Metallurgy	3. Iron and steel and their products 13. Railway repair shops 10. Metals and metal products	6. Metal, machines, conveyances, etc.	5. Iron and steel 6. Non-ferrous metals	5. Metal and other minerals
11. Ceramics	9. Stone, clay and glass products	4. Bricks, pottery, glass	7. Non-metallic mineral, industries	Under (1)
12. Chemical products	8. Chemicals and allied products	8. Chemicals, paint, oils	8. Chemical	Under (1)
13. Food products (and tobacco)	1. Food and kindred products 7. Liquors and beverages 11. Tobacco	10. Food, drink, tobacco	1. Vegetable product industries	3. Food and drink and narcotics
14. Dress and toilet	Under (2)	9. Clothing	Under (3)	Under (2)
15. Furniture	Under (4)	Under (11)	Under (4)	Under (4)
16. Building		13. Building and contracting	10. Construction	7. Construction of buildings, roads, and railways
17. Construction of vehicles	12. Land vehicles	Under (6)	Under (5)	Under (1)
18. Production and transmission of power		15. Gas, water, electricity	Under transport and public utilities	6. Fuel, light, and energy
19. Industries relating to literature and artistic trades	6. Paper and printing	12. Paper and printing	Under (4)	1. Art and mechanical production
20. Industries of refuse matter				6. Disposing of the dead or refuse
21. Others	14. Miscellaneous	14. Other manufactures	9. Miscellaneous	9. Undefined industrial pursuits

Switzerland	Germany	Belgium	Italy	South Africa	France
4. Textiles	9. Textiles	9. Textiles	4. Industries working and using textiles	10. Textiles and dress	4F. Textiles 4H. Straw, feathers
Under (5)	11. Leather and leather goods	13. Skin and leather	Under (1)	12. Animal and vegetable substances	4I. Leather and skins
Under (3)	12. Wood	12. Wood and furniture	Under (1)		4J. Wood
7. Metallurgy, machines, tools	5. Working of metals 6. Machines and apparatus	4. Metal industries	2. Industries working in metals	8. Workers and dealers in art and mechanical productions	4K. Metallurgy 4L. Metals 4M. Jewellery, watches, etc.
	4. Stone and earth industry	5. Ceramic 6. Glass	Under (3)	Under "working in minerals"	4P. Stone, etc.
5. Chemical products (not food)	7. Chemical 8. Fats, soap, oil	7. Chemical	5. Chemical industries	Under (8)	4C. Chemical industry
1. Food and drink	13. Food	8. Food 14. Tobacco	1. Industries utilising agricultural products	11. Food, drink, and tobacco	45. Food industry
2. Clothing and toilet	14. Clothing 15. Cleaning toilet	1. Clothing	Under (4)	Under (10)	4G. Clothing
3. Building and furniture	Under (12)	Under (12)	Under (1)	Under (8)	Under (4J)
	16. Building	1. Building and construction	3. Industries working in minerals, buildings, construction	3. Construction	4Q. Construction
Under (7)	Under (6)	Under (12)		Under (8)	Under (4J)
		Under (7)	6. Industries corresponding to collective needs	Under (8)	Under (4Q)
5. Paper, leather, rubber 8. Polygraphic arts	10. Paper 17. Printing 18. Fine arts	15. Paper 16. Book 17. Art and precision		Under (8)	4D. Rubber and paper 4E. Printing and bookbinding
				14. Undefined	

organisation based on the industrial unit and in relation to the product rather than to the material worked in. In other words, the same industrial developments which have rendered systems of classification on the basis of the materials used unsuited to the needs of modern communities are causing the growth of trade unions organised on other bases than the materials worked in.

The classifications of various countries show the extent to which they are based on the materials used, and what part is played by other principles. Table II which gives the classification of manufacturing industries adopted in the Bertillon Scheme, and by various countries, shows that this factor is of considerable importance, and most of the classifications given include groups for the textile, leather and skin, wood, and metal industries. In sub-divisions, too, the material is often important, the textile group, for example, being usually divided into the cotton, wool, silk, jute, etc. branches. But even in the countries which tend to make the material used the basis of their classifications there are many exceptions. Thus practically all countries have a group for "food", in which case the purpose of the product is the basis. Many have a "building and construction" group, where the process or the product is the principle considered. In the Bertillon scheme, under the main division of manufacturing industries, are given certain groups based on the materials used, and including textiles, leather, wood and metal, and these are followed by groups based on the purpose of the product including food, clothing, furniture, and buildings. Here then two different methods of classification are combined.

Certain countries base their classification or part of it on the materials, but group these according to origin, *i.e.* generally into the three divisions—vegetable, animal, and mineral. As an example of a classification in which the materials are grouped according to origin, that used in the *Annual Report of the Trade of Canada*, 31 March 1920, may be mentioned. The system is not used for the presentation of details but for summaries and analyses(1). The classification according to origin has the main headings, articles of vegetable origin, of marine origin, of forest origin, of mineral origin, and of mixed origin (2). Each of the main headings has sub-divisions for raw materials, partly manufactured articles, and fully

(1) The whole classification is tripartite, the same data being grouped according to the component material of the commodity and the use or purpose of each commodity, as well as to the origin of the material.

(2) It is somewhat illogical to give separately articles of forest origin when there is also a group of articles of vegetable origin.

or chiefly manufactured articles. A classification by origin of material has value for certain summary purposes, but evidently is incomplete, and must be supplemented by classifications based on other principles. It suffers from the defect that the group of articles of mixed origin is likely to be either extensive or arbitrary.

Again, the same principle is applied though less completely in the classification of manufacturing industries given in table II for Canada, where the groups "animal product industries" and "vegetable product industries" are given, food, for example, being divided between the two. Separate groups are given to "wood and paper industries" although these are largely of vegetable origin, and to "textiles", which could be given in part under "animal products" (*e.g.* wool) and in part under "vegetable products" (*e.g.* cotton).

In the Italian classification, one main division is given of "industries utilising agricultural products", while groups are given of "industries working in minerals" and "industries working in metals".

In the South African and Australian classifications, which are almost identical, a group "working in food, etc." is given, with sub-divisions "animal" food and "vegetable" food. The United States food group is also subdivided into animal products and vegetable products.

In the British classification the materials worked in play a large part in determining the main divisions; the subdivisions, however, indicate many processes, such as smelting, converting, refining and rolling iron and steel, and textile dyeing, printing and bleaching, etc., while many of the groups are based on products such as clothing, vehicles, cutlery. In the metal etc. group quite arbitrarily vehicles are given, with subgroups for the building of coaches and carriages and for aeroplanes, airships, and balloons. In these products, other materials than metals are used and in some cases are predominant. Shipbuilding is also included in the metal group, whether the vessels constructed are made of wood, iron, steel or concrete. Again, boots and shoes are excluded from the leather group, and, except when made of rubber, are given with clothing. With these articles certain other countries keep more closely to a classification based on the materials used. Thus Canada gives the wagons and carriages and the canoe, rowboat and launch industries which use wood largely, with the wood group, while the difficulty with regard to shipbuilding is overcome by placing it as a subgroup of "construction". Vehicles made primarily of metal such as automobiles and cycles are given in the iron and steel group.

In the United States classification the material used is predominant in determining not only the main divisions but also the subdivisions. A separate group is, however, given for vehicles for land transportation, while the miscellaneous group is large, and includes shipbuilding, subdivided into iron and steel, and wooden. It also includes industries dealing with materials other than those classified in the main divisions, *e.g.* rubber, ivory, fur, feather and other industries, as well as many in which two or more materials are used.

In Spain, the materials used are important in determining the classification for the census. Also the Institut de Reformes sociales uses, in connection with its labour statistics, a classification based largely on the materials, but partly on the product, while data are given separately according as the statistics refer to establishments under public authorities or not.

The Belgian classification groups rubber clothing with rubber, boots and shoes under leather, sabots and wooden ships with wood, and iron ships with iron. The Italian system follows a somewhat similar practice. The German classification, on the other hand, keeps less closely to the material used. Thus boots and shoes are included with clothing, not with leather, while the difficulty with regard to shipbuilding and the construction of vehicles is avoided by placing them in a group called the "manufacture of machines, instruments, and apparatus". In Switzerland, too, boots and shoes are given with clothing, while furniture is included with building. In that country a number of products made of two or more materials, *e.g.* wagons, carriages, and pianos, are included with the metal group. The South African and Australian classifications give boots and shoes, straw hats, etc. with clothing, while furniture, wagons and carriages, boats and ships, machines, tools and implements, saddlery, watches, philosophical instruments, etc. are given in the group "art and mechanic productions", little attention being paid to materials used. Groups are, however, given for textiles including clothing, and skins and leather; also a group is given of industries "working in minerals". New Zealand gives ship and boat building with metals, and boots and shoes with clothing, thus following closely the British practice.

These examples indicate a great diversity of classification from the point of view of the material used, in the practice of different countries. They also indicate the difficulties and incompleteness of a classification based solely on the component material.

II. *The Process.*

Processes of manufacture may consist merely in shaping some material in order to produce partly manufactured goods or finished articles. They may consist, as is usual in the early stages of manufacture, in splitting up or analysing composite raw materials into separate components. This may be done either mechanially, by the application of heat, as in the smelting and refining of metals, or may involve chemical action. They may consist in combining materials, either the same or different, together into a partly manufactured good or into a finished product. Again the process of combination may be mechanical or chemical. From the point of view of the mechanical combination of materials the construction of ships might well be grouped with the construction of bridges, buildings, railways, etc. The latter are generally given separately from shipbuilding because although there is a certain similarity of process, the industrial units are quite distinct and the materials worked in and the products themselves differ. The construction of buildings, of railways, of roads, etc. are often grouped together, as the establishments engaged in constructing these different products are often the same and the processes and the materials are generally similar. Special attention may here be called to certain industries which mainly manufacture goods to be used as the raw material of other industries whose process is entirely different. In some cases, however, they also make finished products by a process similar to that employed in producing the "partly manufactured goods". For example, the textile industry is generally quite distinct in process from the clothing industry for which it produces the raw material. Hosiery and similar goods, *i. e.* finished products, are, however, produced by a process very similar to various processes in the textile industry proper. Some countries, for example the United Kingdom and the United States, group hosiery with the textile industry on account of similarity of process and industrial structure. Others group it with clothing.

The process of manufacture is not adopted in any country as basis for a complete scheme of classification although it determines certain main divisions, *e. g.* engineering, building and other construction, and printing. These, however, usually include among their subdivisions groups based on the material used or the product. The process employed determines various subdivisions of such groups as metals and textiles. Thus smelting, converting, refining, and rolling of iron and steel, and spinning, weaving, dyeing, printing, and bleaching of textiles are processes generally given as parts

of the main groups. Often both process and material or process and product are combined. In the British classification, for example under the heading "woolen manufacture (spinning and subsequent processes)", *i. e.* a group based on material, there is given the sub-group "wool-weaving", in which material and process are combined. Similar practices occur in the groupings of most countries. The process, however, appears to play a less important part in determining various classifications than do the material used and the product.

III. *The Product.*

As with the other possible bases of classification, the product or purpose is rarely used alone, but is usually combined with one or more of the other bases in determining the complete scheme. Certains groups, for example food, clothing, furniture, etc. given in the classifications of many countries are determined by this principle, thus enabling certain products to be grouped together, which on the basis of the material would be separated. As an example of this, the group "boat and shipbuilding" may be given, whereas if the material used is taken as basis this clear group will be widely separated and given as subdivisions of the metal and wood groups. The principal defect of this basis is due to the almost infinite variety of products of modern industry and the practical impossibility of combining them into groups which are not only logically sound, but which provide for a clear view of the productive organisation of the community to be obtained.

An attempt is made in the Canadian manufacturing code to base the classification principally on the purpose of the product. Groups are given for clothing, food, drink and tobacco, personal and household utilities, books and stationery, material, equipment, and miscellaneous. Evidently the difficulties in this classification lie in the last three groups.

In the details of various classifications certain countries tend to use the product as a determining factor more than others. It is not necessary to repeat here the examples given in the discussion above of the basis "materials used". It is sufficient to give one example of the different practices adopted. Thus in the British classification, straw hats, cloth hats and caps, and felt hats are all given together in the clothing group; while in the United States hats and caps other than felt, straw and wool are given in a group "articles from textile fabrics for personal wear"; wool-felt hats and

fur-felt hats are given under "textile fabrics and materials", while straw hats are given in the miscellaneous group.

It appears desirable where the undertakings engaged on making a given product are quite distinct, to form them into a separate industrial group. Thus establishments engaged in boat and ship building are rarely engaged in producing other goods, and there appears little reason for giving them as branches of the wood or metal groups.

Summary

It is evident from the above review that certain countries have constructed classifications mainly on one of the bases discussed, while in others two or more have had considerable application. Even where one basis seems to predominate, however, many exceptions may be found, and in a number of countries historical development, economic structure, and reasons of clearness and practical convenience appear to have predominated in determining the classification. It is only by forming a very lengthy and unwieldy miscellaneous group that a system based on one of these principles seems possible.

The two bases which appear to have had the greatest effect in determining the various classifications are the materials used and the product, some countries tending to favour one and some the other, but generally using both, while certain groups as indicated above are determined by the process (1).

It has been shown that in the early stages of industrial development a comparatively small number of groups mostly based on the materials worked in, certain groups based on the product, *e. g.* food, clothing, etc., together with a group determined by such a fundamental process as construction, were satisfactory. With modern industrial development, however, the material worked in is usually a determining factor in the early stages of manufacture, while in the later stages the product is of prime importance, and industrial units are organised not so much in relation to the material worked in as in relation to the final product which may be composed of many materials.

In proposing a classification suitable for general adoption, account has been taken of the factors discussed above, and the principle has been adopted of giving groups based on the materials used as foundation, but wherever, the industrial organisation permits or

(1) The Canadian Government in criticising the draft classification proposed by the Technical Commission on Unemployment expressed the opinion "that divergent points of view ought not to be introduced into any single scheme."

demands that an important group be given separately on the basis of process or product, a separate group shall be formed. Such a principle may be expected to lead to a classification which, when used for statistical presentation, should give a clear indication as to the industrial structure of a country. For the sake of keeping the main groups small in number, certain industries engaged in the production of comodities of relatively small importance have been left as subgroups within the main group based on the materials used, while in other cases separate products are grouped together, *e. g.* food, drink, and tobacco.

In this connection and before discussing the proposed classification, one more problem may be outlined. It arises on account of the fact that some establishments manufacture a number of different products whether by having various plants or by having various products from one plant. Other establishments may specialise in the manufacture of one of these products only. How should the former establishments be classified ? Should an attempt be made to divide them up according to the different products ? Where one product is of chief importance and the the others are by-products, should the undertaking be grouped solely according to the principal product ? Evidently in an ideal statistical compilation each product would be grouped independently, so as to enable accurate results to be obtained.

Suggested Classification

In proposing a scheme of classification on the principles outlined above, only the main groups of manufacturing industries are distinguished, and certain of the more important borderline cases and subgroups discussed. Within the groups proposed, further expansion in the subgroups may be made by the more detailed application of the principles here adopted.

With regard to most of the important groups there is little difficulty, while doubtful cases are classified either according to the materials worked in or according to the product by taking into account the characteristics of the industrial organisation, care being taken, however, that the resulting groups may be clear and definite. With regard to certain borderline cases it is unavoidable that the proposals made are somewhat arbitrary.

Taking first the principle of classification according to the materials used the following separate manufacturing industries may be distinguished: wood; metal; textiles; leather, skins and rubber. The nature of the product determines the groups

clothing; construction of boats, ships and other vehicles; of buildings, roads, etc.; the preparation of foods and drinks; the manufacturing of machinery; of bricks, pottery and glass; of paper, bookbinding and printing; of furniture making and furnishings; of chemical and allied products; and the production and transmission of gas and electricity and the supply of water and water power. A separate group is given covering the manufacture of scientific and musical instruments, of clocks and watches, together with industries working in precious metals and stones. Finally, a short group of other manufacturing industries combines various groups of minor importance not elsewhere classified. Each of the groups proposed is discussed below, and suggestions are made for the classification of the most important borderline sub-groups. Reference is also made to the practice of various countries both as regards the main groups and the doubtful sub-groups.

(1) *Woodworking industry.* — The problem encountered in this group as in others is that many articles are made partly of wood and partly of metal or some other material, while many products which used to be made entirely of wood are now made largely of metal. The consequences of economic and industrial development on classifications are well illustrated in the case of shipbuilding, which would have presented no difficulty in the days when all vessels were constructed of wood. Now, however, some countries, for example the United Kingdom and New Zealand, give boat and ship building in the metal group. In France, Belgium, Italy, and Canada wooden ships are given in the wood group and iron ships in the metal group, while Australia and South Africa include boats and ships as a sub-group of the category "Art and Mechanic Productions". The difficulty with regard to shipbuilding applies also to the construction of vehicles for land and air transportation, and the classifications of the different countries show considerable differences with regard to these groups. As, however, ships and vehicles for land and air transportation are sufficiently definite to form a separate group based on the product, and as the undertakings concerned in the production of these products are quite distinct from those engaged solely in woodworking, they are here classified separately.

A second difficulty arises with regard to furniture which is included as a branch of the woodworking industry in the classification of a number of countries. Here it is given as a separate group for similar reasons to those outlined above with regard to shipbuilding, and the construction of vehicles.

Certain countries, for example Canada, include paper-manufacturing in the wood group, but in the proposed scheme it is given together with printing and bookbinding as a separate group. Straw and basket work are included along with wood in the proposed scheme, this being the practice of the United Kingdom, Germany, Austria, the Netherlands and other countries (1).

The wood group therefore includes saw-milling (2) and joinery together with the manufacture of articles whose constituent material is mainly wood, with the exceptions or additions noted above.

(2) *Furniture manufacture.* — Although a number of countries include furniture with the woodworking industry, it appears preferable to follow the practice of other countries, *e.g.* New Zealand, and to give it as a separate group. It is true that many articles of furniture are made almost entirely of wood, but with regard to other articles such as upholstered furniture, other materials play a considerable part. Further, certain articles of furniture are made very largely of metal, as, for example, iron bedsteads. It seems preferable, then, as furniture making constitutes a definite product and as the undertakings concerned in its manufacture can generally be separated without difficulty from those engaged in the manufacture of other products, to constitute furniture-making into a separate group. In addition to ordinary articles of furniture the group, here proposed may be taken to include such furnishings as bedding, mattresses, etc.

(3) *Metal industry.* — In conformity with the practice of most countries, the group includes (*a*) primary processes in the manufacturing of metals, as for example the smelting, converting, refining and rolling of iron and steel, and the extracting and refining of other metals (except precious metals) and alloys; (*b*) founding and other secondary processes. Here, however, the conformity ceases, and industries engaged in the manufacture of various important products in which metal plays a considerable part are given separately, and the metal group is confined largely to the production of partly manufactured articles. Certain finished products of metal are, however, included in the metal group, *e.g.* iron rails, the direct product of the secondary processes. In these cases the undertakings and plants and processes are so closely linked together that to effect a separation would be almost impossible and would give results of little value in relation to the industrial structure.

(1) In France a separate group is given, which includes industries engaged in working with straw, feathers, hair and leather, and in boot, shoe and glove-making.

(2) Certain countries include saw-milling along with forestry.

Of the main industries often included in the metal group, but which it is here proposed to give separately, mention may be made of the manufacture of machinery and of miscellaneous metal products such as cutlery, tools and utensils, the construction of ships and vehicles for land and air transport, the manufacture of scientific instruments, clocks and watches, and working in precious metals. In these cases the product is generally manufactured by establishments quite distinct from those of the metal processes indicated above, and the process quite distinct.

The practice of various countries may be outlined. As already indicated, most countries give the manufacture of machinery, etc., in the metal group. Germany, however, has adopted a practice more nearly in conformity with that here proposed by giving engineering separately from the metal group, but the engineering group includes wagons and shipbuilding, the manufacture of musical and mathematical instruments and apparatus, and the production of electricity. In Austria a somewhat similar practice is adopted. In the United States a separate group is given for metals and metal products other than "iron and steel", and this group includes watch making. In Canada separate groups are given for iron and steel manufacture and for non-ferrous metal industries, the latter including electrical supply factories.

(4) *Manufacture of machinery and miscellaneous metal products.* — This group may be taken to include establishments engaged in various engineering processes and in the manufacture of miscellaneous products such as cutlery, tools, utensils, etc. It will include the manufacture of electrical apparatus and of agricultural implements which in the United States are given in the miscellaneous group. It does not, however, include shipbuilding or the construction of vehicles, the manufacture of scientific and musical instruments, clocks and watches, nor working in precious metals, which are formed into separate groups because of the special nature of the processes and the independent character of the establishments concerned. Where possible, too, plants engaged in the production of iron furniture are excluded from this group. It is not necessary here to refer to the practices of various countries as these have already been mentioned in the discussion on the metal group or are given later.

(5) *Construction of boats, ships, and vehicles for land and air transport.* — These products are given in a separate group, because they constitute a well-defined group in which the undertakings are

generally distinct from those of other groups. By constituting them into a separate group also the difficulties are avoided of giving them in the wood or in the metal group, although in many cases they consist of both materials, or of dividing them between the wood and the metal groups — a practice which appears unsatisfactory. Even in the most doubtful cases, namely, those of such products as railway engines and bicycles which might well be given in the group "manufacture of machinery", they may be grouped equally well here as the establishments engaged in their production are generally quite distinct. The group proposed corresponds largely with sub-order 6, Vehicles, and sub-order 7, Shipbuilding and Repairing and Marine Engineering, which are parts of the metal group in the British classification. It includes, however, the manufacture of steam locomotives which are given in sub-order 4, Engineering (not marine or electrical). The practice of various countries with regard to the products given here is very indefinite and they are often scattered in different groups. Thus in Denmark, France, and Canada, wagon and carriage building are included in the wood group. In France, Belgium and Italy, iron ships are given in the metal group, and wooden ships and boats in the wood group. In Italy, wooden land vehicles are given in the wood group and iron ones in the metal group. In Germany, wagons, railway rolling stock, and shipbuilding are part of the engineering group. In the United States, the manufacture of land vehicles is given as a separate group, while shipbuilding, both wood and iron, are given in the miscellaneous group. In the Netherlands, shipbuilding and vehicle construction are given as a separate group, but bicycles and steam engines are included in the engineering group. In New Zealand, carriages and wagons, motor cars, boat and shipbuilding are included in the metal group.

(6) *Manufacture of bricks, earthenware, glass, etc.* [1] — This group is given separately in the classification of most countries. Among the exceptions may be noted: Italy, which gives this group along with industries working in minerals; Germany, which gives quarrying as part of the group; Switzerland, where the group is given along with building and furniture; Canada, which gives it as non-metallic mineral industries; and Australia, which includes it under art and mechanic production. Certain differences in

[1] The Canadian Government in its reply on the draft classification proposed by the Technical Commission on Unemployment suggested the adoption of the order followed here of gixing the group « bricks, earthenware and glass » and that of « buildings, construction, etc. » consecutively.

detail also exist and mention may be made of stone and slate cutting which in most countries is given here, but which in the British classification is given together with cement, artificial stone, and concrete in the group "mining and quarrying". In the proposed scheme they are included with the group under discussion.

There is an evident difficulty here, as certain parts of the group, *e.g.* stone and slate cutting, and the manufacture of bricks concrete, etc. might well be classified according to the materials worked in, especially as they serve as the "raw" materials of the building industry. They are quite distinct from certain final products, *e.g.* pottery etc. which on the principles adopted would evidently be most suitably classified according to the product. The two groups are here united largely as a matter of convenience, and to avoid the necessity of forming two small groups. Within the group itself, however, by subdivisions the distinction generally adopted in the proposed scheme may be maintained, certain branches being given together according to the materials worked in, and others according to the product.

(7) *Construction of buildings, roads, railways, etc.* — This group is given separately on account of a considerable degree of similarity of process, and the fact that often building contractors undertake the work of making or repairing roads, railways, bridges, etc. Further the materials handled are so diverse as to render impossible a classification based on the material.

Practice differs between the different countries as to whether building is given separately or combined with establishments contracting for the making and repairing of roads, railways, bridges and canals, etc. The more usual course appears to be to combine the two, and this course is followed here. Each may however, be put separately as a sub-group, and therefore the proposed classification differs little from those which give separate groups for building and for other construction. The group is also taken to include the installation of gas, water, and electricity.

Among the chief exceptions mention may be made of Denmark and Switzerland, which include furniture in the building and construction group. Switzerland gives stone cutting, cement, glass and pottery, and also wood-sawing and cutting, and the manufacture of brushes and brooms on this group. The South African and Australian group includes many things generally given in the "public services" group. In Canada, shipbuilding is given as a subdivision of the group "construction".

(8) *Production and transmission of gas and electricity and the supply of water and water power.* — Difficulties with this group are caused by the existence of important by-products such as dyes in connection with the production of gas, and also because electricity is produced in many cases directly in connection with transport, and might be included in that group.

A considerable number of countries include parts of the group under discussion with the chemical industry, while in others they are distributed without any uniformity among various groups. Some countries, however, give them as a separate group, and as they appear to constitute a fairly clearly defined group this course is followed here (1). This is in general conformity with the Bertillon scheme, and with the British, Austrian and New Zealand classifications, while the Dutch scheme and the Australian classification give fuel, light, and energy as a separate group. In Denmark, gas and coke manufacturing are included in the group "chemical and technical". In France, gas for lighting is classified with chemicals. In Norway also, means of lighting and heating, and in Belgium and Roumania, gas and electricity works are given with chemicals. In Germany and Switzerland, the production of electricity is included with engineering; in Italy, power, light and water, and in Canada, power and light, are given as part of the public utility services group. In the Netherlands and Roumania, waterworks are included in the food and drink group; in South Africa, water is given as sub-order 5 in the group "working or dealing in minerals", which also includes coal, fuel, light, and energy (sub-order 2).

(9) *Manufacture of chemicals and allied products.* — This group may be taken to include the manufacture of chemicals and soap, varnish and paints, oils, fats, fertilisers, sheep dips, disinfectants, dyes, drugs, explosives, and matches. Most countries give such a group, and exceptions as in the almost identical Australian and South African systems are due to the adoption of large groups with many sub-divisions.

As already noted, a number of countries give gas or electricity in the chemical group. France gives tobacco with chemicals. In Germany, oils, grease and soap, together with forestry by-products and gas manufacture, are grouped separately. Belgium includes rubber manufacture in the chemical group. In the Italian

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(1) This course is recommended by the Japanese Government in its reply on the draft classification proposed by the Technical Commission on Unemployment.

classification, the group includes sugar manufacture, distillation of alcohol, rubber and tobacco manufacture, while wines and beers are also given in the chemical group. In Switzerland, a group of non-food chemical products is given which includes artificial silk making and also gas production. In Canada, explosives, drugs and medicines manufacture and oil refineries are not included, being given together in the non-metallic mineral industries group. The New Zealand classification gives with chemicals, animal and vegetable products not otherwise classified, and in consequence, several sub-groups not strictly belonging to the chemical group are included, for example tanning, wool-washing, and grain-threshing.

(10) *Textile industry.* — This group includes the ordinary textile processes such as carding, combing, spinning and weaving, and also textile dyeing, printing, bleaching and finishing. The chief difficulty with regard to this group is as to the inclusion of clothing. The majority of countries give clothing separately, a practice which is followed here, as the products are quite distinct from the textile industry proper, and are generally the results of processes which are different and are undertaken by different establishments. In France, Italy, and the United States, however, clothing is included in the textile group. In certain classifications, for example those of the United Kirgdom and Canada, clothing is given as a separate group, while hosiery and other knitted goods are given as subdivisions of the textile group. The latter is done because the hosiery process are closely allied with those of the textile industry. As, however, establishments manufacturing hosiery are usually distinct, hosiery is here given with the clothing group. Again, certain classifications, for example the British, give the manufacture of carpets and rugs as part of the textile industry. Here it is proposed to give them with furniture and furnishings.

(11) *Clothing industry, including hosiery and boots and shoes.* — This group includes tailoring, dress-making, manufacture of underclothing — including hosiery goods — millinery, and the manufacture of hats, boots, and shoes. Articles of clothing whether made of textiles, leather, rubber or other materials, are included in this group as far as the distinct character of the undertakings allows. In the case of rubber clothing it is not clear whether the industrial structure is such that separate establishments are generally engaged in making such goods only, or whether the various establishments which produce rubber clothing also produce other rubber goods,

in which case it might be ncessary to give a separate group "rubber and its products". A difficulty arises in the case of boots and shoes which, for example in Belgium and Roumania, are given in the leather group. A large number of countries, however include boots and shoes in the clothing group, and this practice is followed here. A second difficulty arises with laundering, dyeing and cleaning of clothing, etc., which, for example in Germany is given as a separate group and in New Zealand is part of the personal and domestic service group. These processes are, however, so closely connected with clothing that it appears more satisfactory to include them in this group(1). Other doubtful cases may be mentioned; for example some countries classify the manufacture of straw hats, sabots, rubber boots and gloves and similar articles of clothing in a group or sub-group based on the materials used. Where possible it is proposed that these should be grouped with clothing, but where the industrial organisation is such that these articles constitute a small part only of the output of the industries concerned and other articles of the same material are produced, a classification based on the material may be necessary. Walking-sticks are given in the United Kingdom and Switzerland in the clothing group, but it appears to conform more with existing praccite and to be clearer to include them in the wood group.

(12) *Manufacture of leather, skins (other than boots, shoes and gloves) and rubber.* — This group generally includes the tanning, currying and dressing of leather, and the preparation of furs and skins together with the manufacture of various articles made of leather and skins not included in the clothing group, for example. saddlery, leather belting, bags, and trunks. It would be possible to separate out various products, but they are given here for convenience in order to avoid forming a large number of groups. For a similar reason rubber is here given. The question of the inclusion or exclusion of articles of clothing made of rubber has already been considered.

It may be noted that various countries give boot, shoe, and glove making in "leather and skins group". In the German classification, rubber manufacture is included in the group "leather and similar materials", while in Norway leather and rubber are

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(1) On the other hand, the reply of Finland with regard to the draft classification proposed by the Technical Commission on Unemployment includes the statement that "laundry and cleaning work is in no way connected with the clothing industries, and it would be better to transfer them to a heading for miscellaneous work, for which a special group could be created."

grouped together, as is done in the present proposal. In Austria, leather and paper are given together, while rubber is grouped with wood.

(13) *Preparation and manufacture of foods, drinks, and tobacco.*— Practically all classifications include a food group, but certain countries give drinks and tobacco separately or in other groups. The general practice is, however, to give them together with food(1). Amongst the exceptions, mention may be made of France which, as already stated, includes tobacco with chemicals, of Belgium which gives tobacco separately, and of Italy which gives sugar and the manufacture of alcohol, beer, and other drinks, and of tobacco, in the chemical group, and food in the group "industries utilising agricultural products". The United States gives food separately and subdivides it into animal and vegetable, while Canada divides food between the groups vegetable products manufacture and animal products manufacture. The United States also gives separate groups for drinks and for tobacco. In Canada, liquors and beverages are given in the vegetable products group, except milk, which is given logically in the animal products group. Tobacco is given in the former group. Among the doubtful commodities for inclusion or exclusion, mention may be made of medicines and chemical foods. Certain countries include them with the food group and others with chemicals. Some countries, for example, the Netherlands and Roumania, include waterworks in this group.

(14) *Manufacture of paper, bookbinding and printing, including photography.* — Some countries, for example, the United Kingdom and the United States, give paper and printing as a separate group with sub-divisions, while others, for example the Netherlands, Germany, Austria(2), Denmark, and Belgium, give each separately. Where this is the practice no difficulty would be experienced by combining them into one group, as is here proposed. In certain cases, however, for example Canada, paper manufacture (3) is grouped with wood, consideration being given to the raw material used, namely, wood-pulp. In the Italian classification, paper

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(1) In the replies of the governments, on the drafts of the Technical Commission on Unemployment the desirability of grouping tobacco with foods and drinks is indicated — for example by Czechoslovakia, Esthonia, Finland, Germany, Netherlands and Switzerland.

(2) In the Austrian classification, leather and paper are grouped together.

(3) Together with printing.

manufacture is given in the group of agricultural and allied products. A number of countries include photography as a branch of the sub-group "printing", and this course is followed here. The British classification includes the manufacture of pencils and penholders in this group, whereas in other countries they are given as part of the wood group, *e.g.* in Germany, or in the miscellaneous group, *e.g.* in the United States. This last practice is followed here. In Switzerland, paper, leather and rubber, and in France. paper, cardboard and rubber, are grouped together, while printing and photography are given as a separate group.

(15) *Manufacture of scientific and musical instruments, clocks and watches, and working in precious metals and stones.* — This composite group is suggested to avoid the necessity of giving these industries as separate groups or of extending unduly the miscellaneous group. They are related to a certain extent by the high degree of skill and delicacy of work often involved. Thus diamond cutting might be grouped with ordinary stone cutting in a classification based on the material handled a course which is followed in the Austrian classification, but such a grouping would be highly inappropriate on account of the great differences in the processes involved and of the establishments.

In the Belgian classification a group is given of "Industries d'art et précision", which corresponds closely with the one here proposed, and includes the manufacture of scientific instruments and apparatus, of clocks and watches, of musical instruments, the working in precious stones, photography, and artistic trades. France gives precious stones, watchmaking and jewellery as a separate group. In Denmark and Switzerland scientific instruments and apparatus, and musical instruments, are given in the metal group. In the Netherlands, where diamond cutting is of considerable importance, it is given as a separate group, while scientific instruments and apparatus are given in the metal group. In the Austrian, Swiss, French, British, and a number of other classifications, working in precious metals is given in the metal group.

(16) *Other manufacturing industries.* — An effort has been made to keep this group small. Its main purpose, as is evident from the practice of a large number of countries, is to find a place for a number of industries which do not fall clearly into one of the other groups, and are not of sufficient importance to be given as separate groups. The same principles may be applied as those

which determined the groups given above, and the industries given here are generally based either on the material used or on the product.

The following may be given as typical of the industries which may be grouped here:

Bone, horn, ivory, tortoiseshell, celluloid, etc.
Feather dressing, cleaning and dyeing.
Artificial flower making.
Manufacture of toys, games and sports requisites.
Manufacture of pens, pencils, pipes, brooms and brushes, etc.

The practice of various countries differs very considerably with regard to the miscellaneous group. Some countries have no such group, this being possible either on account of the nature of the classification or because of an arbitrary forcing of various industries into inappropriate groups. Thus the United States gives the manufacture of agricultural implements in the miscellaneous group, while the British group "other manufacturing industries" includes the manufacture of photographic plates, films and papers, which here are grouped with chemicals. On the other hand, Belgium gives toys, etc. in the wood group.

These examples show the difficulties encountered particularly in this group, and demonstrate the necessity if a greater measure of uniformity of classification is to be obtained of deciding clearly the disposition of industries which tend to overlap the various groups given.

The classification which is proposed within the main group of Manufacturing Industries, and which has been discussed in some detail above, may be summarised as follows:

Manufacturing Industries

1. Woodworking industry.
2. Furniture manufacture.
3. Metal industry (other than precious metals), including primary processes, founding, and secondary processes.
4. Manufacture of machinery and miscellaneous metal products, including cutlery, tools, utensils, etc.
5. Construction of boats, ships, and vehicles for land and air transport.
6. Manufacture of bricks, earthenware, glass, etc.
7. Construction of buildings, and the making and repairing of roads, railways, bridges, canals, etc.
8. Production and transmission of gas and electricity, and the supply of water and water power.
9. Manufacture of chemicals and allied products.
10. Textile industry.

11. Clothing industry, including hosiery and boots and shoes.
12. Manufacture of leather and skins (other than boots, shoes and gloves), and of rubber and its products.
13. Preparation and manufacture of foods, drinks, and tobacco.
14. Manufacture of paper, bookbinding and printing, including photography.
15. Manufacture of scientific and musical instruments, clocks and watches, precious metals and stones.
16. Other manufacturing industries, including those working in materials such as bone, horn, ivory, celluloid, etc., and those manufacturing various products, *e.g.* toys, pencils, brooms and brushes, artificial flowers, etc.

Difficulties would naturally be experienced by various countries in adopting a classification different from those now in use. Apart entirely from the reorganisation necessary, a change renders incomparable the statistics for different groups after the change with those before. These difficulties indicate the desirability of avoiding changes as much as possible, but it might be thought that the advantages of a greater uniformity internationally outweigh the temporary inconvenience. The adoption of the proposed or any other uniform classification would not involve as many difficulties as might be thought at first sight, as apparent divergences in different countries are often due not to any great differences in detailed classification but to differences in the manner of presentation. Thus two countries may have exactly the same basic groups and yet show apparently totally different results. Country A may have 100 separate basic groups and combine them into 20 larger groups, and these 20 into six main divisions, while country B may have the same 100 basic groups but combine them into 30 larger groups and into 10 main divisions. The former may give "textiles" as a main division, and the latter give three main divisions to cotton, wool, and other textiles respectively. One country may give paper and printing as a main division, while another gives them separately. It is evident that in such cases rearrangements could be effected without great difficulty in order to bring the systems into conformity with a uniform classification. Also, in order to compare statistics forperiods after the change with those before, a rearranging of the basic groups would be possible.

VI

Classification of Occupations

In dealing with the classification of workers by occupations the problem is somewhat different. Occupation is a personal character-

istic, and all occupations are exercised within an industry either in the form of individuals working for an employer or working on their own account. The starting point may therefore be either the individual or the establishment in which the occupation is found. If the individual is taken as the starting point, as is usually done in the general population censuses of the different countries, the process is to some extent a synthetic one and the results are built up from the individual returns. If the undertaking or department is taken as starting point, the process is analytic and each undertaking is analysed into the different occupations found therein. The disadvantages of the first method are that it bears little if any relation to the economic structure or industrial organisation of the country and that it depends on the free statement of the individual.

A classification of the individuals of a country according to their personal occupation can only be carried out in detail by means of a general census inquiry addressed to each household. In this way every worker is reached and a complete conspectus of the occupational activities of the workers is obtained. Each person indicates his personal occupation, and instructions are usually issued to the individual or to the census agent indicating the type of answer required and the degree of definiteness. The basis is usually the material worked in or handled, or the process performed. The occupations usually returned are, however, so numerous and varied that it is essential, in an attempt at classifying occupations, to have a complete index of occupations. Most countries have such a list and the extent of the detail necessary may be gauged from the fact that these lists usually contain many thousands of entries. The one used by Germany in 1907 contained over 10,000 entries, while the one prepared for the British census of 1921 contains no less than 35,000 entries. Such detailed lists are necessary for the interpretation of the statements of occupations given by individual workers, but in labour statistics generally and especially in connection with international comparisons, statistics by occupations in any such detail are not usually required. As pointed out in Section II it is generally only for placing workers in employment or for demographic questions such as occupational mortality, etc., that an exact description of the process performed by the individual, the material worked in, or the degree of skill are required. For certain countries glossaries have been prepared showing the nature of the work and the qualifications required for each specified designation, and are very useful. These have been attempted in the

Répertoire technologique and the *Description of Occupations* of the United States Government.

In a general way, each individual may be said to have two occupations — his personal occupation and his occupation in the particular industry with which he is connected. A "calenderer" in a paper mill, for example, is very different from a "calenderer" in a laundry or textile factory, and a general census of occupations throws no light on these difficulties. One attempt which has been made in certain countries (*e.g.* the United Kingdom) to get over these difficulties is that of asking, in addition to the personal occupation, for the name of the firm or the industry or service with which the worker is connected, and though this frequently enables doubtful and ambiguous cases to be satisfactorily described and classified, it still leaves a large number of doubtful cases which perforce have to be described as "other workers", The other method (adopted in Belgium for example) is that of issuing at the same time a schedule to all industrial and commercial establishments asking for the number of workers of various kinds employed on the day of the Census. The establishments are then classified according to industries, etc., and the numbers engaged in the different industries are thus obtained. This system seems on the whole preferable. Theoretically a national occupational census by the expenditure of sufficient money and by elaborate organisation and individual questioning should give whatever information is required, but as a matter of fact it does not.

From the point of view of labour statistics, what is most important is not the precise detailed occupation of the individual. It is generally immaterial whether the worker is a grinder or a slotter; a plumber or a gas fitter. An examination of the published statistics of wages, hours, unemployment and accidents, etc., will show that such detailed information is never utilised outside the census returns. What is required is a classification of occupations showing the position of workers in relation to the establishment. An establishment knows not only the number of its employees but also their working hours, their status, their skill, the nature of their work, the processes they perform and the exact position of each employee in the plant. An establishment also possesses the material by which it can classify its workers into skilled, semi-skilled, and unskilled. This classification cannot be done by any census based on individual or household questionnaires nor even, in some cases, by trade unions, for the title of the occupation alone does not always indicate whether the worker is skilled or not.

Many occupations mean little when considered apart from the industries in which they are pursued, and the best form of classification for our purposes is an occupational classification with an industrial framework. We then take into consideration primarily the milieu in which the worker exercises his calling and not the commodities, etc., which he produces. It is, for example, important to know the grade of occupation of persons gainfully occupied, *i.e.* whether they are employers, working on their own account, working for an employer, or assisting the head without wage or salary; whether they are occupied in a factory, a workshop, an office, in the house, in the open air, etc. These different categories can then be grouped if necessary according to the different products.

Labour statistics are primarily concerned with those occupied workers who are working for salary or for wages, and it is generally of greater importance to know the grade, skill and position in the establishment than the actual product on which the worker is engaged. Hence they might be classified according to whether they are engaged directly in production or only indirectly; whether they are skilled, semi-skilled, unskilled, apprentices etc.; whether they are technical or supervisory staff, clerical staff, craftsmen, warehousemen and packers, porters and messengers, outworkers, etc. and a classification of this nature would prove much more useful for most branches of labour statistics than the ordinary detailed classification of personal occupation.

VII

Application to the Various Classes of Labour Statistics

It is now necessary to consider again the principal classes of labour statistics and see to what extent the remarks in the previous sections apply.

As regards statistics of wages, the two main sources of information for rates are employers and trade unions, while for earnings, employers' returns alone are almost the only source. The comparison of wages between different countries, different periods, or different categories of workers would be greatly simplified if the information was based on employers' returns classified according to some agreed and uniform scheme, such as that presented in Section V. In statistics of wages, information is required not only as to wages in different industries, but also as to different groups of workers

within each industry. Within each industry or establishment information could be obtained by sex, by age, by occupation, by skill or by process. The grouping by occupation would naturally vary according to the nature of the industry. The most useful groups concerning which comparisons are of greatest value between different industries or different countries are the skilled, semi-skilled, and unskilled, and these could be grouped in the absence of further information or of definite lines of demarcation, according to the level of wages paid. As regards wage rates, in so far as these are based on trade union agreements, it is impossible to make much progress towards international comparison owing to the fact that they are based on trade union organisation which is sometimes on a craft basis (*e.g.* a carpenters' trade union), sometimes on an industrial basis (*e.g.* a railwaymen's trade union), sometimes on a basis of a group of kindred crafts (*e.g.* a union of workers in wood), or sometimes on a sex basis (*e.g.* a union of women weavers) and other bases, but in this case information is frequently available as to rates of wages for skilled and unskilled workers.

As regards statistics of employment and unemployment, the sources as a rule are, in the case of the former, the establishment, and of the latter the workers' organisations and labour exchanges.

In the first case the remarks above as to statistics of wages (earnings) largely apply. The industrial classification of the establishments could be the same as that for wages, but information in the same detail as to the occupations within the industry is not so necessary. Unemployment chiefly affects industries as such, and not especially occupations or groups within that industry. Skilled and unskilled workers are usually equally affected by the state of trade. As regards statistics of unemployment based on workers' organisations, the remarks made above as to the statistics of union rates of wages are applicable and little progress can be made in this sphere. Thus the British Government in its criticism of the draft classification proposed by the Technical Commission on unemployment states that "as regards trade union statistics, neither exclusively occupational nor an exclusively industrial classification can be adopted, since some unions base their membership on craft and others on industry while others are partly craft an partly industrial". Again the reply of the Netherlands Government indicates that in that country, unemployment data are furnished by the trade unions, without any distinction as to the calling of the members. In consequence, "such a distinction, however useful and desirable it may be would be very

difficult to adopt in the Netherlands at the present time, and there can be little hope of its being achieved". It is further pointed out that "when the members of several different trades form one federation, the organisations involved only take their own particular interests into account, and existing occupational divisions have no influence on the result". Evidently then, unemployment or other data obtained from trade union sources can be classified largely only according to groups formed for the purposes of the labour organisations of the different countries, and which do not correspond with those formed for other purposes.

Labour exchanges exist primarily for placing the "right man in the right job", and a classification of workers for use in labour exchanges must therefore in the main be occupational and also extremely detailed. It must indicate not only occupation but the different classes or grades must be indicated. It is not sufficient, for example, to describe a man as a fitter. He must be classified as an electrical fitter, die sinker, machine tool fitter, etc., in order that he might be placed in a job suitable to his qualifications and experience. In using statistics of labour exchanges as a measure of unemployment, *i.e.* as showing the demand for and supply of labour, it is usual to group the detailed classification into the main occupational groups, and in this case there is nothing to prevent the grouping being made according to a definite scheme or so as to fit into any other existing scheme of classification. One other source of unemployment statistics should be mentioned, viz. that derived from schemes of insurance which are not worked through workers' organisations. Only one or two countries publish information of this nature. In the United Kingdom for example the classification follows closely that used in the general Census of the Population and it based on the individual worker. Each worker is required, on becoming insured to state his occupation and where he works. On the basis of this information the number of insured workpeople and the number unemployed at any date can be classified according to a list of occupations and a list of industries. Statistics as to unemployment in the different occupations, however, are not published, but only those in the different industries.

As regards statistics of industrial accidents, the basic unit in this is the establishment in which the worker is engaged or sometimes an association of employers grouped together for the purpose of insurance. Statistics of industrial accidents are never obtained direct from the workers or workers' organisations. The general

scheme of classification, therefore, must be an industrial one based on the establishment. For accident statistics, however, the classification according to cause of accident, nature of objects handled or machinery used is perhaps of greater value than classification by industries.

With regard to statistics of strikes and lock-outs, the sources of information are employers (or employers' associations) and workers' organisations, but even when information is obtained from workers' organisations it is generally based on the establisment in which a strike or lock-out has occured, for in most countries the statistics give the number of establishments affected in each industrial group. Statistics of strikes and lock-outs, however, have one special feature, in that it is very often necessary to distinguish the branch or department of an establishment. Trade disputes sometimes originate and are confined to a certain branch of an employer's business; and in this case the establishment is sometimes too broad a unit.

As regards statistics of sickness and old age insurance, these are somewhat distinct from labour statistics properly so called, for not only the gainfully employed but also women and children and employers may be covered in the scheme, and the methods adopted differ very greatly from country to country, according to the legislation in force. The statistics may cover voluntary or compulsory organisation; they may cover only employed persons or all persons with less than a certain income; sometimes the scheme is worked through workers' organisations, sometimes through an employer or an employers' association in the same industry, sometimes through local bodies which cover several or all industries. These schemes often overlap and individuals may be insured in more than one way, and at the present stage there is little hope of co-ordination in this field.

VIII

Concluding Remarks

We see than that there are two distinct aspects in which the economic activities of the people may be regarded. There is the industry or service with which the worker is connected, and there is also the personal occupation carried on within that industry. These two are quite distinct and cannot be treated together. A

classification of industries and services is best based on the establishments or plants in which the occupations can be carried on. They cannot be grouped according to any logical scheme such as the final purpose or nature of the product or service, the process carried on or the material worked in, but it is perhaps possible on the basis of existing classifications and of agreement as to certain borderline or overlapping cases to draw up a list of the main groups which would prove acceptable.

The classification of occupations depends to some extent on the branch of statistics for which they are required. Though in some cases very detailed classifications might be required, yet generally in labour statistics, such as wages, hours, employment, the most suitable picture of the occupational position of each worker is an occupational classifications within an industrial framework by means of which emphasis is laid not so much on the materials handled or the processes performed as on the grade and social position of the worker within the establishment which supplies his means of livelihood.

APPENDIX I

Bertillon's Draft Scheme for Classification of Occupations

General Divisions	First Classification
A. *Production of Raw Materials.*	
I. Exploitation of the surface of the ground and water.	1. Agricultural works. 2. Fishing and hunting. 3. Nomad population.
II. Extraction of minerals.	4. Mines. 5. Quarries. 6. Salines.
B. *Transformation and Use of Raw Materials.*	
III. Manufactures.	
(a) Industries classified according to the materials used.	7. Textiles. 8. Leather, skins, and hard animal matters. 9. Wood workers. 10. Metallurgy. 11. Ceramics. 12. Chemical products proper and similar articles.
(b) Industries classified according to the nature of the needs to which they apply.	13. Food products. 14. Industries of dress and toilet. 15. Furniture making. 16. Building industries. 17. Construction of vehicles. 18. Production and transmission of power. 19. Industries relating to literature and artistic trades.
(c) Not grouped.	20. Industries of refuse matters. 21. Other industries.
IV. Transport.	22. Transport by sea. 23. River and canal transport. 24. Transport on streets, roads and bridges. 25. Transport by rail. 26. Post, telegraphs, telephones.
V. Commerce.	27. Banks, credit, exchange and insurance. 28. Brokerage, commission, exportation. 29. Trade in textiles. 30. Trading in leather, skins. 31. Trading in wood. 32. Trading in metals. 33. Trade in ceramic goods. 34. Trading in chemical products, drugs, paints, and dyes. 35. Hotels, coffee-houses, restaurants, bars, and drink merchants. 36. Other trades in alimentary products. 37. Trading in articles of dress and toilet. 38. Trade in furniture. 39. Trading connected with house property. 40. Trade in means of transport. 41. Trade in fuel. 42. Trading in luxuries and articles connected with science and arts. 43. Trade in refuse matters. 44. Other trades.
C. *Public Administrations and Liberal Arts.*	
VI. Public force.	45. Army. 46. Navy. 47. Police and coastguards.
VII. Public administration.	48. Public administration.
VIII. Liberal arts.	49. Religious bodies. 50. Judicial bodies. 51. Medical professions. 52. Educational professions. 53. Science, literature, and art.
IX. Persons living principally on their private means.	54. Persons living principally on their private means.
D. *Various Occupations.*	
X. Domestic work.	55. Domestic work.
XI. General designation without indication of a determined occupation.	56. Merchant, employee, day worker or without further description.
XII. Unproductive and unknown occupations.	57. Persons temporarily unemployed. 58. Persons without occupation. 59. Non classified persons. 60. Beggars, vagabonds, and prostitutes. 61. Occupation unknown.

APPENDIX II

Resolutions of British Empire Statistical Conference

In January 1920 the Conference of Statisticians of the British Empire, held to discuss the co-ordination of statistics within the British Empire, passed the following resolutions concerning industrial classifications:

Resolutions

1. The adoption of uniform systems of classification and listing of industries and of occupation for census and other statistical purposes within the Empire is of utmost importance.

2. The Classifications referred to in the above Resolution should be based on two lists, one of industries and the other of occupations, each heading being defined and given a reference number, and the headings so arranged as to be capable of grouping into classes according to a fixed and defined system.

3. (i) The basic principle of the industrial classification should be the product or type of service, and that of the occupational classification the process carried out and the materials worked in.

(ii) As regards the industrial classification the principle of arrangement under the following heads should be adopted subject to any modification found necessary after detailed consideration of the further sub-division of these main groups. It should be the function of the proposed British Empire Statistical Bureau to endeavour to define suitable sub-groupings for a uniform presentation of industrial statistics for Empire purposes. The main groups are:

1. Primary production (including agriculture, mines, fishing, forestry, etc.)
2. Secondary production, including treatment of raw materials, and including manufacture.
3. Transport and communication, posts, telegraphs.
4. Trade and commerce.
5. Public administration, defence, and professions.
6. Domestic services.
7. Other industries.
8. No industry.

APPENDIX III

System adopted in the " Répertoire technologique des noms d'industries et de professions ".

I. *Fishing.*

II. *Foresty and Agriculture.*

Forestry.
Agriculture.
Gardening.
Breeding.

III. *Mines and Quarries.*

Coal mines.
Metal mines.
Other mines.
Quarries.

IV. *Preparation of Food and Kindred Products.*

Milling.
Butter, cheese.
Sugar.
Distillery, spirits.
Drinks.
Baking, confectionery.
Preserves.

V. *Chemical Manufacture.*

Starch, potato flour.
Pharmaceutical products.
Tobacco.
Oil, grease, glue.
Manures.
Acids, alkalis, salts.
Electrochemistry.
Explosive substances.
Distillation (wood, coal, etc.).
Colouring matter.

VI. *India-Rubber, Gutta.*

VII. *Paper, Pasteboard.*

VIII. *Polygraphy.*

Bookbinding.
Printing, engraving.
Photography.

IX. *Textile Industry.*

Unspecified materials: spinning.
Unspecified or mixed materials: weaving.
Flax, hemp, etc.
Cotton.
Wool.
Silk.
Bleaching.
Finishing.
Dyeing.
Hosiery.
Laces.
Light fabrics.
Embroidery.
Trimmings.

X. *Manufacture of Clothing.*

Sacking, sailcloth, etc.
Bedding, upholstery.
Dress making.
Linen.
Umbrellas.
Hats, slippers.
Artificial flowers.
Laundering and cleaning.

XI. *Basket ware, Matting.*

XII. *Hair and Feathers.*

XIII. *Leather and Skins.*

Skins and furs.
Leather.

Leather goods.
Boots and shoes.
Gloves.

XIV. *Woodworking Industry.*

Sawing.
Carpentry.
Wooden ships.
House carpentry.
Vehicles.
Wooden wares.
Furniture, cabinet-making.
Musical instruments.
Toys, games.

XV. *Metallurgy.*

Iron and steel.
Other metals.

XVI. *Metal Working.*

Forge.
Cutlery, edged-tool making.
Wire drawing, chains.
Iron and steel wares.
Iron building.
Sheet iron goods.
Arms.
Iron ships.
Boiler making.
Iron founding.
Mechanical engineering.
Cycles, motor cars.
Electrical machinery.
Coppersmith's wares.
Copper and brass foundry.
Cutting-out, stamping.
Surgical instruments.
Precision instruments.
Musical instruments.
Tinplate goods.
Zinc goods.
Tin goods.
Leaden goods.
Engraving on metal.
Watch and clock making.
Galvanoplastic.

XVII. *Precious Metals.*

Refining.
Gold and silver wares.
Jewellery.

XVIII. *Stone Cutting.*

XIX. *Works of Construction, Building.*

Public works, navy.
Water, electricity supply.
Roofing, plumbing.
Masonry.
Painting, glazing.

XX. *Lime, Ceramic, Glass.*

Lime, plaster, cement.
Bricks, tiles, pottery.
Crockery, chinaware.
Glass making.

XXI. *Conveyance.*

Loading and unloading,
Post, telegraph.
Land transport.
Railways.
Street railways.
Sea shipping.
Inland navigation.
Air navigation.

APPENDIX IV

Scheme of the International Association of Industrial Accident Boards (North America)

I. *Agriculture.*
   1. Agriculture.

II. *Mining, Metallurgy, and Quarrying.*
   2. Mining.
   3. Metallurgy.
   4. Quarries and stone crushing.

III. *Other Extractive Industries.*
   5. Forestry.
   6. Fisheries.

IV. *Manufacturing.*
   7. Food.
   8. Textiles.
   9. Clothing.
   10. Laundries, cleaning, and dyeing.
   11. Leather.
   12. Rubber and composition goods.
   13. Paper and pulp manufacturing.
   14. Paper goods.
   15. Printing.
   16. Wood products.
   17. Blast furnaces, steel works, and rolling mills.
   18. Metal goods.
   19. Machinery (not forging or woodwork).
   20. Fine machines and instruments.
   21. Vehicles.
   22. Stone products.
   23. Clay products.
   24. Glass products.
   25. Chemicals.

V. *Construction.*
   26. Construction (not building erection nor shipbuilding).
   27. Building erection and demolition (occupational classification).
   28. Shipbuilding.

VI. *Transportation and Public Utilities.*
   29. Water transportation.
   30. Steam and electric railroads.
   31. Cartage and trucking.
   32. Utilities.

VII. *Trade.*

33. Commercial.

VIII. *Clerical and Professional Service.*

34. Clerical and professional employments.
35. Care and custody of buildings and grounds.
36. Miscellaneous occupations (domestic service, policemen, firemen, etc.).

APPENDIX V

Classifications adopted in different countries [1]

UNION OF SOUTH AFRICA (Census of 1911)

I. *Professional.*

1. Persons engaged in the general or local government (not otherwise classed) or in the defence or protection of the country.
2. Persons ministering to religion and charity, law, health, education, art, literature, science, and amusement.

II. *Domestic.*

3. Persons engaged in domestic offices or household duties.
4. Persons engaged in the supply of board and lodging and in rendering personal offices and attendance on man.

III. *Commercial.*

5. Persons who buy, sell, exchange or insure, keep or lend money, property or goods of all kinds.
6. Persons engaged in the conveyance of men, animals, goods, and messages.

IV. *Agricultural.*

7. Persons possessing, working, or cultivating land; raising or dealing in animals, or following pursuits subsidiary thereto.

V. *Industrial.*

8. Persons working or dealing in art and mechanic productions, in which matters of various kinds are employed in combination.
9. Persons engaged in the construction or repair of buildings, railways, roads, docks, earthworks, water storage works, and in the disposal of the dead, dead matters, refuse.
10. Persons working or dealing in textile fabrics, in dress, and in fibrous materials.
11. Persons working or dealing in food, drinks, narcotics, and stimulants.
12. Persons working or dealing in animal and vegetable substances.
13. Persons working or dealing in minerals.
14. Persons engaged in mechanical operations or labour the nature of which is undefined.

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(1) The countries are given in alphabetical order as determined by their French names.

VI. *Indefinite.*

15. Persons of property or rank, or independant means not returned under any occupation, also persons whose pursuits are imperfectly described.

VII. *Dependents.*

16. Persons dependent for support upon natural guardians.
17. Persons supported by the community.

VIII. *Unspecified.*

18. Persons whose occupation is unknown or unspecified.

GERMANY (Industrial Census of 1917)

A. Agriculture, Tending of Animals, Fishery.

I. Gardening, horticulture, care of fruit trees, etc.
II. Tending of animals (except those to be used for agricultural purposes) and fishery.

B. Industry, including Mining and Construction.

III. Mining, smelting, salt-mines, brine pumping and evaporation, peat-cutting.
IV. Stone and earth industries.
V. Working of metals.
VI. Machines, instruments, apparatus industry.
VII. Chemical industry.
VIII. Forestry by-products, production of gas, soap, fats, oil, candle-making, colouring matters.
IX. Textile industry.
X. Paper industries.
XI. Leather and similar goods.
XII. Wood and similar goods.
XIII. Food, drink, etc.
XIV. Clothing.
XV. Cleaning, laundry, toilet.
XVI. Building.
XVII. Printing.
XVIII. Fine arts.

C. Trade and Commerce, including Hotel Industry.

XIX. Trade.
XX. Insurance.
XXI. Transport and communications.
XXII. Hotels, etc.
XXIII. Music, theatres, etc.

AUSTRALIA (Census of 1911)

A. Breadwinners.

I. *Professional.*

1. General Government.
2. Local Government.
3. Defence.
4. Law and order.

5. Religion.
6. Charity (except Hospital).
7. Health.
8. Literature.
9. Science.
10. Civil engineering, architecture, and surveying.
11. Education.
12. Fine arts.
13. Music.
14. Amusements.

II. *Domestic.*

1. Board and lodgings.
2. Domestic service and attendance.

III. *Commercial.*

1. Dealing in property and finance.
2. Dealing in art and mechanic productions.
3. Dealing in textile fabrics, dress, and fibrous material.
4. Dealing in food, drinks, narcotics, and stimulants
5. Dealing in animals and animal and vegetable substances.
6. Dealing in fuel and light.
7. Dealing in metals and other minerals.
8. General and undefined merchants and dealers.
9. Speculators on chance events.
10. Engaged in storage.

IV. *Transport and Communication.*

1. On railways (not construction).
2. On roads.
3. On seas and rivers.
4. On postal service.
5. On telegraph and telephone service.
6. Delivery of documents, parcels, etc. by hand.

V. *Industrial Class.*

1. Working in art and mechanic productions.
2. Working in textile fabrics, dress, and fibrous material.
3. Working in food, drinks, narcotics, and stimulants.
4. Working in animal and vegetable substances.
5. Working in metals and other minerals.
6. Working in fuel, light and other forms of energy.
7. Constructing buildings, roads railways, etc.
8. Disposing of the dead or of refuse.
9. Engaged in undefined industrial pursuits.

VI. *Primary Producing Class.*

1. Agricultural pursuits.
2. Pastoral pursuits.
3. Hunting and similar pursuits.
4. Fisheries.
5. Forestry.
6. Water conservation and supply.
7. Mines and quarries.

VII. *Independent.*

Persons of independant means having no specific occupation.

B. Non-Breadwinners.

VIII. *Dependent.*

Persons dependent upon relatives or natural guardians, including wives, children and others not otherwise engaged in pursuits for which remuneration is paid; and all persons depending upon private charity, or where support is a burden on the public revenue.

AUSTRIA (Census of 1910).

A. *Agriculture and Forestry.*

I. Agriculture, etc.
II. Forestry, etc.
III. Fisheries.

B. *Manufacturing Industries.*

IV. Mining and smelting.
V. Stone and earth industries.
VI. Working of metals.
VII. Engineering.
VIII. Chemical industry.
IX. Gas, electricity, water stations.
X. Building.
XI. Printing.
XII. Textile industry.
XIII. Paper and leather industries.
XIV. Working in wood, other carved materials, and rubber.
XV. Food and drink.
XVI. Clothing.
XVII. Others.

C. *Trade and Commerce.*

XVIII. General trade.
XIX. Finance, credit, etc.
XX. Railways.
XXI. Other means of transport.
XXII. Other forms of trade and commerce.
XXIII. Hotels, etc.
XXIV. Domestic service.

D. *Public Services, Professions, etc.*

XXV. Defence.
XXVI. State and royal services, etc.
XXVII. Education, etc.
XXVIII. Other professional services.
XXIX. Persons of independent means, etc.
XXX. Persons living in different institutions, etc.

BELGIUM (Census of Industries and Commerce, 1910)

CLASSIFICATION OF INDUSTRIAL AND COMMERCIAL OCCUPATIONS

Section I. — Industrial Occupations

A. *Fisheries.*

I. Sea fishing.
II. Fresh water fishing, pisciculture, oysterculture, mussel-culture.

B. *Industry.*

I. Mining.
II. Quarries.
III. Raw metal industry.
IV. Metal manufacturing.
V. Pottery.
VI. Glass industry.
VII. Chemical industry.
VIII. Food and drink industry.
IX. Textile industry.
X. Clothing industry.
XI. Construction.
XII. Furniture and wood industry.
XIII. Hide and leather industry.
XIV. Tobacco industry.
XV. Paper industry.
XVI. Printing and bookbinding industry.
XVII. Making of instruments (including watchmaking and jewellery).

Section II. — Commercial Occupations

I. Sale or hiring of industrial or agricultural products.
II. Banking, insurance, transport, agents, and hotel industry.

CANADA (Census of 1921)

I. *Industrial Classification*

1. *Agriculture.*
   1. Mixed farming.
   2. Crop specialisation.
   3. Animal husbandry.
2. *Logging, fishing, and trapping.*
   1. Logging.
   2. Fishing and trapping.
3. *Mining.*
   1. Metalliferous mining.
   2. Non-metallic mineral mining.
4. *Manufacturing.*
   (*a*) Classified according to component material of principal product:
      1. Manufactures of vegetable products.
      2. Manufactures of animal products.

3. Textile industries.
4. Wood and paper industries.
5. Manufactures of iron and steel.
6. Non-ferrous metal industries.
7. Non-metallic mineral industries.
8. Chemical and allied industries.
9. Miscellaneous.

Note: No. 4 may be regarded as a sub-division of 1, if necessary, and No. 3 divided between 1 and 2.

(*b*) Classified according to use or purpose of principal product:

1. Food.
2. Clothing.
3. Drink and tobacco.
4. House furnishings.
5. Books and stationery.
6. Vehicles and vessels.
7. Producers materials.
8. Industrial equipment.
9. Miscellaneous.

(*c*) Classified according to extractive origin of principal product:

1. Manufactures based on agriculture.
2. Manufactures based on fisheries.
3. Manufactures based on forestry.
4. Manufactures based on mining.

5. *Construction.*

1. Excavation and construction under or on the ground — not building.
2. Buildings and structures above ground.
3. Shipbuilding.

6. *Transportation and Public Utilities.*

1. Transportation.
2. Public utilities.

7. *Trade.*

1. General trade.
2. Trade in vegetable products.
3. Trade in animal products.
4. Trade in textiles.
5. Trade in wood and paper.
6. Trade in iron products.
7. Trade in non-ferrous metal goods.
8. Trade in non-metallic mineral goods.
9. Trade in chemical and allied products.
10. Trade in miscellaneous commodities.

8. *Finance.*

1. Banking.
2. Investment and loan operation.
3. Insurance.

9. *Service.*

1. Professional establishments.
2. Public administration.

3. Recreational service.
4. Custom and repair.
5. Personal service (hotels, barbers, laundries, land agents).
6. Business service.
7. Personal service (boarding houses, charwomen, domestic servants, etc.).

10. *Miscellaneous categories.*

II. *Occupational Classification*

All industries are classified into the following groups:

Proprietors.
Officials.
Professionals.
Foremen and overseers.
Clerical employees.
Skilled employees.
Semi-skilled employees.
Labourers.
Miscellaneous.

SPAIN (Census of 1920).

1. Fishing.
2. Forestry and agriculture.
3. Mines and quarries.
4. Food industries.
5. Chemical industries.
6. Rubber.
7. Paper.
8. Printing.
9. Textile industries.
10. Clothing.
11. Basket making and manufacture or articles of esparto.
12. Hair and feathers.
13. Leather and skins.
14. Wood industries.
15. Metallurgy.
16. Metal working.
17. Working in precious metals.
18. Building, shipbuilding, etc.
19. Lime, earthenware, glass.
20. Transport.
21. Commerce.
22. Domestic service.
23. Miscellaneous industries.
24. Defence, police, etc.
25. Public administration.
26. Clergy.
27. Liberal professions.
28. Persons living principally on their private means (Rentiers).
29. Pensioners.
30-34. Various, including persons without occupation, students, etc.

UNITED STATES OF AMERICA (Industrial Census 1920)

I. *Food and Kindred Products.*

Animal products.
Vegetable products.

II. *Textiles and their Products.*

Textile fabrics and materials.
Articles from textile fabrics for personal wear.
Other textile products.

III. *Iron and Steel and their Products.*

Crude iron and steel and rolled products.
Other iron and steel products.

IV. *Lumber and its Manufacture.*

V. *Leather and its Finished Products.*

VI. *Paper and Printing.*

VII. *Liquors and Beverages.*

VIII. *Chemicals and Allied Products.*

IX. *Stone, Clay, and Glass Products.*

X. *Metals and Metal Products other than Iron and Steel*

XI. *Tobacco Manufacture.*

XII. *Vehicles for Land Transportation.*

XIII. *Railroad Repair Shops.*

XIV. *Miscellaneous Industries.*

FRANCE (Census 1906).

Industrial Classification

1. *Fishery.*
2. *Forestry and agriculture.*
3. *Extractive industries.*
   (*a*) *mining.*
   (*b*) *quarries.*
4. *Manufacturing.*
   (*a*) Industries not strictly defined.
   (*b*) Food industry.
   (*c*) Chemical industry.
   (*d*) Rubber, paper industries.
   (*e*) Printing and bookbinding.
   (*f*) Textiles.
   (*g*) Clothing and textile goods.
   (*h*) Straw, feather, and hair insdustries.
   (*i*) Hides and leather.
   (*j*) Wood and wood products.
   (*k*) Metallurgy.

(*l*) Working in metals.
(*m*) Working in precious metals.
(*n*) Precious stones cutting.
(*o*) Precious stones cutting and polishing.
(*p*) Embankments and building in stone.
(*q*) Ceramics and pottery.

5. *Loading and Unloading, Conveyance.*
   (*a*) Loading and unloading.
   (*b*) Transport and conveyance.

6. *Commerce, Entertainments, Banking.*
   (*a*) Trade of different kinds.
   (*b*) Hawkers and showmen, entertainments, etc.
   (*c*) Banking, insurance.

7. *Liberal Professions, Religion.*
   (*a*) Liberal professions.
   (*b*) Religion.

8. *Personal and Domestic Services.*
   (*a*) Personal services.
   (*b*) Domestic service.

9. *State, Departmental, and Communal Services.*
   (*a*) General public services.
      (*i*) Defence.
      (*ii*) Various administrations.
   (*b*) Industrial public services.

10. *Industries and Occupations non specified.*

HUNGARY (Census of 1910).

I. Production of the soil, etc.
   A. Agriculture, horticulture, etc.
   B. Forestry, hunting, charcoal burning.
   C. Bee keeping, silk growing, pisciculture.
   D. Fishing.

II. Mining and metallurgy: industry proper, trade and finance, transport
   A. Mining and metallurgy (primary processes).
   B. Industry.

Industry Proper.

1. Metallurgy (founding and other secondary processes).
2. Machine and vehicle construction, electrical engineering, manufacture of musical and scientific instruments, etc.).
3. Quarries, stone working, pottery, glass, etc.
4. Wood and bone.
5. Leather, rubber, oil cloth, feathers, etc.
6. Textiles.
7. Clothing.

8. Paper.
9. Food industries.
10. Chemical industry.
11. Building.
12. Printing, art, etc.
13. Hotels, restaurants, baths, etc.
14. Other goups.

Other Industries.

1 and 2. Domestic industries, etc.

C. Trade and Finance.

1. Trade in animals, agricultural products, etc.
2. Trade in wood, and other forest products, and in minerals.
3. Trade in metal goods, machines, household utensils, scientific and musical instruments.
4. Trade in earthenware and glass products.
5. Trade in articles of wood, skin, rubber, paper (books excluded), etc.
6. Trade in textile and clothing articles.
7. Trade in food and drinks.
8. Trade in medicines and chemicals.
9. Trade in books and works of art.
10-18. Miscellaneous trade, together with financial organisations such as banks, insurance societies, pawnbrokers' establishments, etc.

D. Transport.

1. Public roads.
2. Railways and tramways.
3. Shipping, port and river services, etc.
4. Postal, telegraphic, and telephonic services.
5-6. Miscellaneous.

III. Public administration, clerical and liberal professions.

IV. Military, naval, and police forces.

V. Day labourers engaged on casual work, or on work of a variable character.

VI. Persons living principally on their private means, pensioners, etc.

VII. Other occupations.

VIII. Persons without occupation, or of unknown occupation.

ITALY (Census of 1911)

A. *Agriculture, Hunting, Fishing.*

1. Agriculture, forestry, cattle breeding, hunting.
2. Fishing.

B. *Extractive Industry.*

1. Mining.
2. Quarrying.
3. Saltworks, peat, mineral waters.

C. *Industries manufacturing and using Products of Agriculture, Hunting, and Fishing.*

1. Wood.
2. Raw materials similar to wood.
3. Cereals.
4. Fruit, vegetable, seeds.
5. Animal products.
6. Spoils of animal.
7. Paper.
8. Various objects produced from agricultural, products, etc.

D. *Industries working in and using Various Metals.*

1. Production of cast iron and steel (primary processes).
2. Production of other metals (primary processes).
3. Manufacturing of metals (subsequent processes).
4. Engineering and construction of heavy machines for agriculture, industry, and transportation.
5. Other mechanical constructions and working of precious metals.

E. *Industries working in Minerals, Construction of Buildings, Road Making and Water Works.*

1. Extraction and working of minerals.
2. Construction of buildings, roads, and water-works.

F. *Industries working or handling Textile Fibres.*

1. Silk.
2. Cotton.
3. Wool.
4. Flax.
5. Hemp.
6. Jute.
7. Other textile fibres.
8. Special textures.
9. Clothing, furnishings.
10. Manufacturing of different textile fibres.
11. Manufacturing of other fibres not specified.

G. *Chemical Industry.*

H. *Industries and Services of public utility or satisfying public needs.*

1. Printing, etc. industries.
2. Production and distribution of power, light, water, heat.
3. Transport by road, rail, and water.
4. Public services, hygiene, sanitation, and fire extinction.

I. *Commerce.*

1. Dealing in goods and food-stuffs (retail and wholesale).
2. Dealing in miscellaneous goods by the same dealer.
3. Dealing in goods non specified.
4. Hotels, restaurants, cafés, barbers.
5. Entertainments.
6. Credit and exchange, insurance, commissions, agencies.

J. *Public and Private Administrations, Professions, and Arts.*

1. Public administrations.
2. Private clerical employment.

3. Domestic service. Cleaning.
4. Defence.
5. Ecclesiastical.
6. Education.
7. Sanitary professions.
8. Legal professions.
9. Letters and Science.
10. Fine arts.

K. *No Occupation.*

L. *Unspecified Occupation.*

NORWAY (Census of 1910)

I. *Agriculture, Cattle Breeding, Forestry, Fisheries.*

1. Agriculture and cattle breeding.
2. Gardening.
3. Other land industry.
4. Forestry and hunting.
5. Fisheries.

II. *Mining and Manufacturing Industries.*

1. Mines, quarries, extraction of turf, and ice.
2. Earth and stone industry.
3. Metal industry and manufacturing of machines, tools, instruments, means of transport, etc.
4. Chemical industry; manufacturing of materials for lighting, heating; fats, oils, etc.
5. Textile and similar industries.
6. Paper industry.
7. Leather und rubber industry.
8. Woodworking.
9. Manufacturing of foodstuffs, drinks, sweets, tobacco.
10. Clothing and toilet industry.
11. Building industry.
12. Polygraphic industry.
13. Unknown or unspecified.

III. *Commerce and Communication.*

1. Trade in Commodities.
2. Money transactions and insurance.
3. Hotels, restaurants, cafés.
4. General transport by land.
5. Railways, tramways.
6. Post, telegraph, telephone.
7. Navigation, shipping, harbours, light-houses, pilotage, rafting, diving, etc.

IV. *Public Service and Liberal Professions.*

1. Civil service, law courts, barristers.
2. Military and naval service.
3. Public health and medical service.
4. Teaching, literary and artistic professions.
5. Church and charities.
6. Other and unspecified public affairs.

V. *Domestic Occupation and Service and insufficiently specified occupations.*

1. Domestic occupation and service.
2. Insufficiently specified occupations and services.

VI. *Income from rents, annuities, pensions, etc.*

VII. *Without Occupation or Income.*

1. Private maintenance.
2. Public relief.
3. Miscellaneous.

VIII. *Occupation unknown.*

SWITZERLAND (Census of 1910)

A. *Extracting and Production of Raw Materials.*

(*a*) Mining and other extractive industries.
(*b*) Agriculture, cattle breeding, gardening.
(*c*) Forestry, hunting, and fishing.

B. *Transformation of Raw Materials.*

(*a*) Food and drink industries.
(*b*) Clothing and toilet necessities.
(*c*) Building and furniture.
(*d*) Textile industries.
(*e*) Paper, leather, and rubber industries.
(*f*) Chemical industry excluding food.
(*g*) Metallurgy, machinery, and tools.
(*h*) Printing industries, etc.

C. *Commerce.*

(*a*) Commerce, banking, insurance.
(*b*) Hotels, cafés, restaurants, boarding, lodging houses.

D. *Transport.*

(*a*) Communication and transport.
(*b*) Other means of transport.

E. *Public Administrations, Liberal Professions.*

(*a*) Public administrations.
(*b*) Legal profession.
(*c*) Hygiene and medicine.
(*d*) Education.
(*e*) Ecclesiastical professions.
(*f*) Other liberal professions.
(*g*) Fine arts.

F. *Domestic and Personal Services and Other Undefined Occupations.*

G. *Persons without Defined Vocation or without Occupation.*

(*a*) Persons of independent means.
(*b*) Persons without occupation.

UNITED KINGDOM (Census of 1921)

Industrial Classification.

I. Fishing.
II. Agriculture.
III. Mining and quarrying, and treatment of non-metalliferous mine and quarry products.
IV. Manufacture of bricks, pottery, glass, etc.
V. Manufacture of chemicals, dyes, explosives, paints, non-mineral oils, grease.
VI. Manufacture of metals, machines, implements, conveyances, jewellery, watches.
VII. Manufacture of textiles and textile goods (not dress), cellulose.
VIII. Preparation of skins and leather, and manufacture of goods of leather and leather substitute (not boots or shoes).
IX. Manufacture of clothing.
X. Manufacture of food, drink, tobacco.
XI. Wood working; manufacture of cane and basket ware, furniture, fittings (not elsewhere enumerated).
XII. Paper making; manufacture of stationery and stationery requisites; printing, bookbinding and photography.
XIII. Building, decorating, stone and slate cutting and dressing, and contracting.
XIV. Other manufacturing industries.
XV. Gas, water, electricity.
XVI. Transport and communication.
XVII. Commerce and finance.
XVIII. Public administration and defence.
XIX. Professions.
XX. Entertainments and sport.
XXI. Personal service (including hotels and catering, but excluding government and local authority).
XXII. Other industries, or industry not stated.

CZECHOSLOVAKIA (Census of 1921).

A. *Agriculture, Forestry, and Fishing.*

I. Agriculture, horticulture, tending of animals.
II. Forestry, hunting, fishing.

B. *Manufacturing Industries.*

I. Mines.
II. Metallurgy.
III. Working in metals.
IV. Engineering.
V. Stone and earth industries.
VI. Glass industry.
VII. Chemical industry.
VIII. Gas works, production and transmission of electricity, distribution of water, etc.
IX. Wood industry.
X. Paper industry.
XI. Printing industry and art.
XII. Textile industry.

XIII. Leather industry.
XIV. Manufacture of clothing.
XV. Articles of toilet.
XVI. Food industry.
XVII. Building.
XVIII. Other industries.

C. *Trade, Banking, and Transport.*

I. General trade (excluding co-operative societies).
II. Co-operative societies, etc.
III. Hawkers, etc.
IV. Hotels.
V. Subsidiary branches of trade.
VI. Banking.
VII. Posts, telegraphs, and telephones.
VIII. Railways, etc.
IX-X. Other means of transport, including auxiliary branches.

D. *State and other Administrative Services, Professions and Army.*

I. Public administrations.
II. Education.
III. Ecclesiastical professions.
IV. Police.
V. Public health services.
VI. Lawyers, etc.
VII. Liberal professions.
VIII. Army.

E. *Domestic and Personal Services, other occupations and occupations not stated.*

I. Independant domestic services.
II. Servants unemployed.
III. Casual workers.
IV. Persons without occupation.
V. Pensioners, etc.
VI. Beggars, etc.
VII. Persons in hospitals, prisons, etc.
VIII. Students not living with their families.
IX. Other occupations and occupations not stated.

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